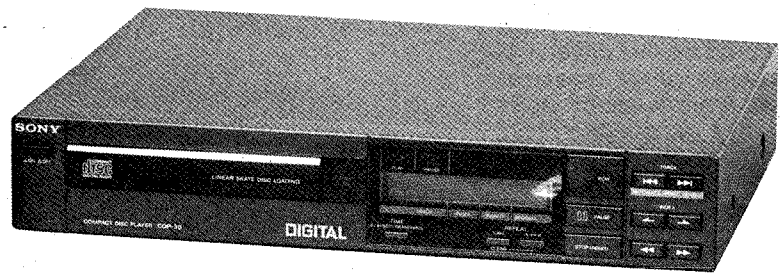
CDP-30

SERVICE MANUAL

US Model
AEP Model
UK Model
E Model



SPECIFICATIONS

System	Compact disc digital audio system
Disc	Compact disc
Laser diode properties	
	Material : GaAlAs
	Wavelength : 780 nm
	Emission duration : Continuous
	Laser output : Max. 0.6 mW*

*This output is the value measured at a distance of about 1.6 mm from the objective lens surface on the Optical Pick-up Block.

Spindle speed	500 r.p.m. to 200 r.p.m. (CLV)
Scan velocity	1.2 - 1.4 m/sec.
Error correction	Sony Super Strategy Cross Interleave Read Solomon Code
Number of channels	2
D-A conversion	16-bit linear
Frequency response	2 - 20,000 Hz ±0.5 dB
Harmonic distortion	Less than 0.004 % (1 kHz)
Dynamic range	More than 90 dB
Channel separation	More than 90 dB
Wow and flutter	Below measurable limit
Outputs	Line outputs Output level 2 V rms (at MSB) Load impedance over 10 kilohms

Disc

Track pitch	1.6 μm
Sampling frequency	44.1 kHz
Quantization	16 bit linear quantizing/channel
Modulation system	EFM
Transfer rate	2.03 Mbit/sec. (before modulation)

General

Power requirements	AEP model: 220 V ac, 50/60 Hz UK model: 240 V ac, 50/60 Hz US model: 120 V ac, 60 Hz E model: 110, 120, 220, or 240 V ac adjustable, 50/60 Hz
Power consumption	15 W
AC outlet	1 unswitched, 100 watts max.
Dimensions	Approx. 355 × 70 × 275 mm (w/h/d) (14 × 2 7/8 × 10 7/8 in.) including projecting parts and controls
Weight	Approx. 3.8 kg (8 lb 7 oz), net

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

MICROFILM

COMPACT DISC PLAYER

SONY®

AUD

PROTECTION OF EYES FROM LASER BEAM DURING SERVICING

This set employs a laser. Therefore, be sure to follow carefully the instructions below when servicing.

WARNING !!

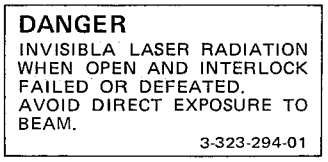
WHEN SERVICING, DO NOT APPROACH THE LASER EXIT WITH THE EYE TOO CLOSELY. IN CASE IT IS NECESSARY TO CONFIRM LASER BEAM EMISSION, BE SURE TO OBSERVE FROM A DISTANCE OF MORE THAN 30 cm FROM THE SURFACE OF THE OBJECTIVE LENS ON THE OPTICAL PICK-UP BLOCK.

1. Laser Diode Properties
   - Material: GaAlAs
   - Wavelength: 780 nm
   - Emission Duration: continuous
   - Laser Output: max. 0.6 mW*
     * This output is the value measured at a distance of about 1.6 mm from the objective lens surface on the Optical Pick-up Block.
   - Classification: Class IIIb
2. During service, do not take the Optical Pick-up Block apart, and do not adjust the APC circuit. If there is a breakdown in the APC circuit (including laser diode), replace the entire Optical Pick-up Block (including APC board).

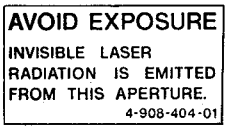
LASER WARNING LABELS

The labels shown below are affixed.

1. Protective Housing Label
   DHHS Interlocked Label . . . . . (US model)

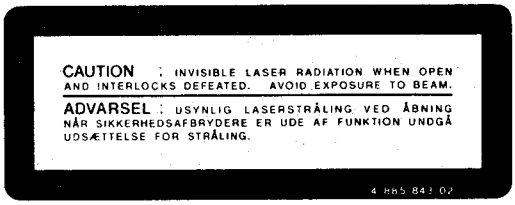


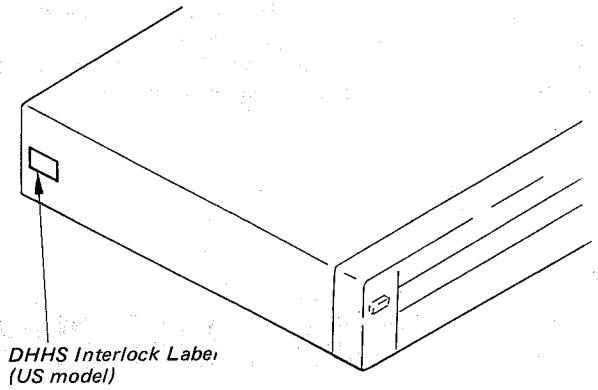
2. Aperture Label. . . . . (AEP, UK, E model)

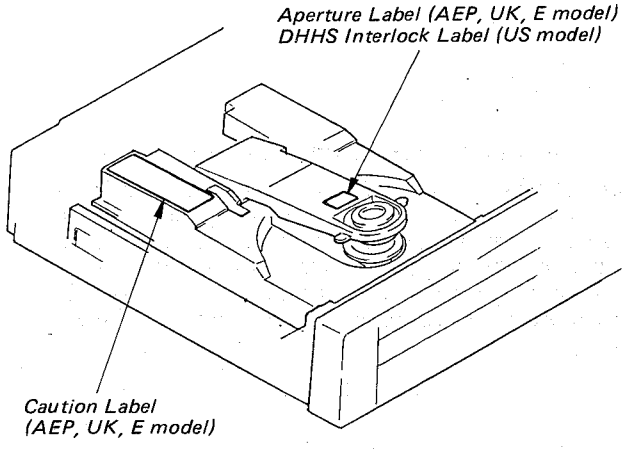


- See figure on next page for location of label.

3. Caution Label . . . . . (AEP, UK, E model)


CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSÆTTELSE FOR STRÅLING.





BESKYTTELSE AF ØJNE MOD LASERSTRÅLING UNDER SERVICE

I dette apparat anvendes laserlys. Derfor skal nedenstående instruktioner nøje følges under service.

Følg iøvrigt instruktionerne i servicemanualen.

ADVARSEL!!

Under service må øjnene ikke komme nær objektiv-linsen på den optiske pick-up enhed. I tilfælde af at det er nødvendigt at kontrollere udsendelsen af laserlys, skal det ske i en afstand af mere end 30 cm fra den optiske pick-up.

1. Data for Laser Diode
   - Materiale: GaAlAs
   - Bølgelængde: 780 nm
   - Udstråling: Kontinuerlig
   - Laser Output: max. 0.6 mW*

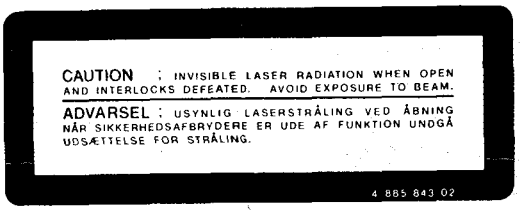
     * målt i 1.6 mm afstand fra overfladen af objektiv-linsen på den optiske pick-up enhsd.
   - Klassifikation: Svarende til klasse IIIb

2. Adskil aldrig den optiske pick-up enhed under service, og juster ikke APC kredsløbet (Automatic Power Control). Hvis APC kredsløbet (incl. laser-dioden) bryder ned, skal hele den optiske pick-up enhed (incl. APC printkortet) udskiftes.

LASER ADVARSEL MÆRKNING (AEP model)

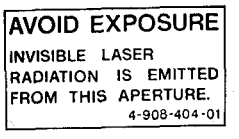
Følgende mærkning findes indvendig i apparatet:

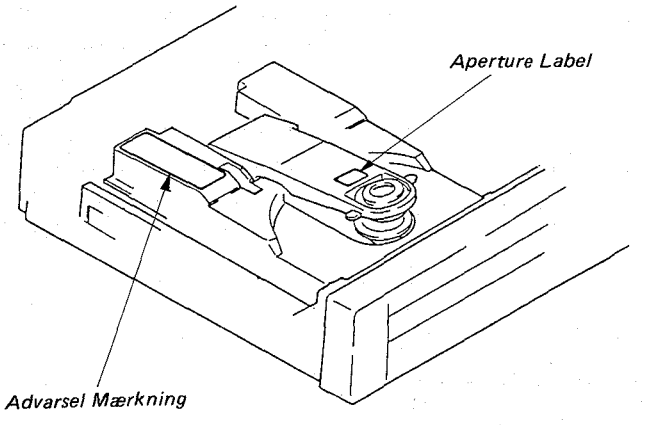
1. Advarsel Mærkning


CAUTION : INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
ADVARSEL : USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSÆTTELSE FOR STRÅLING.
4 885 843 02

- **AEP, UK model**

2. Aperture Label





SAFETY CHECK-OUT (US Model)

After correcting the original service problem, perform the following safety check before releasing the set to the customer:
Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

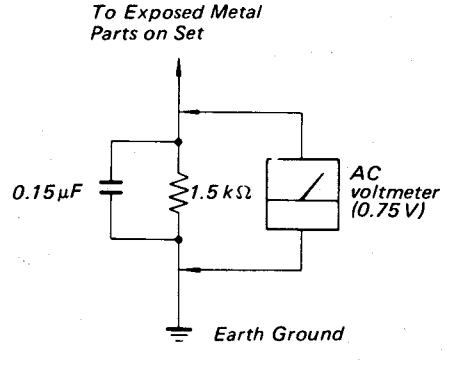


Fig. A. Using an AC voltmeter to check AC leakage.

FEATURES

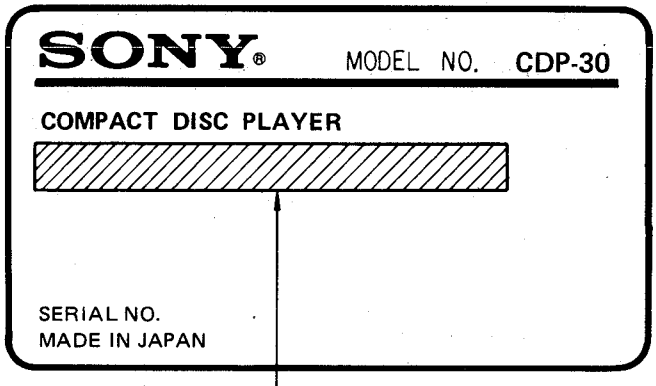
With the CDP-30, flat frequency response (2 - 20,000 Hz), low wow and flutter (lower than the measurable limit), wide dynamic range (more than 90 dB), minimal distortion (0.004%) and high channel separation (more than 90 dB) are achieved. Listening to the sound reproduction of your CDP-30 is just like being in the concert hall.

Quick operation
- Feather-touch function keys for direct mode change.

Various functions
- AMS (Automatic Music Sensor) for quick selection location.
- Index function for quick location of the part you want.
- Full repeat functions for one selection, the whole disc and a particular portion.
- Large and easy-to-read digital display for elapsed playing time and remaining playing time.

MODEL IDENTIFICATION

– Specification Label –



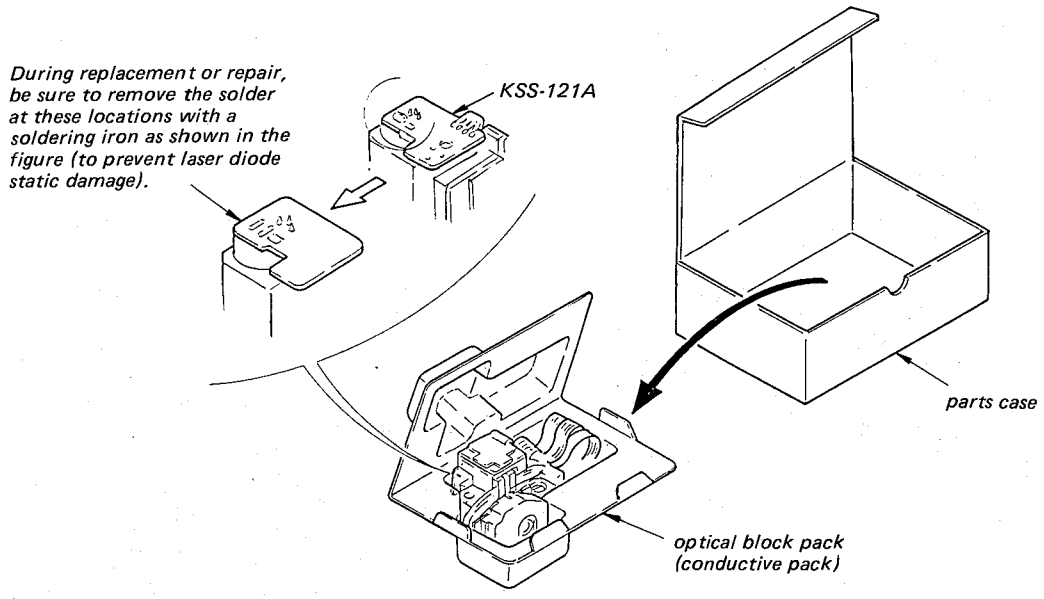
AEP model: AC: 220 V ~ 50/60 Hz 15 W
UK model: AC: 240 V ~ 50/60 Hz 15 W
US model: AC: 120 V 60 Hz 15 W
E model: AC: 110, 120, 220, 240 V ~ 50/60 Hz 15 W

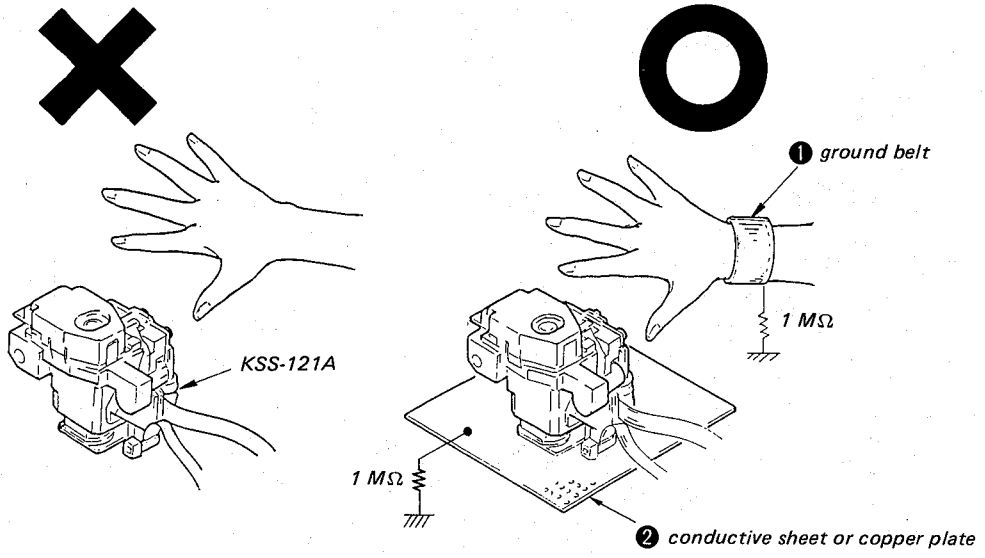
NOTES ON HANDLING THE OPTICAL BLOCK (KSS-121A)

The laser diode inside the optical block may be damaged by static electricity in clothes or the human body.

The following procedures are required when unpacking and repairing KSS-121A in order to avoid static electricity damage.

1. Body grounding
   Be sure to wear a ground belt (less than $10^8\,\Omega$) in order to release the static electricity stored in the body.
2. Workbench grounding
   Place a conductive sheet (less than $10^9\,\Omega$) or copper plate on the bench where KSS-121A is to be placed to ground it.
3. Static electricity in the clothing will not be released by the ground belt, so be careful not to let KSS-121A touch clothing.


During replacement or repair, be sure to remove the solder at these locations with a soldering iron as shown in the figure (to prevent laser diode static damage).
KSS-121A
parts case
optical block pack (conductive pack)

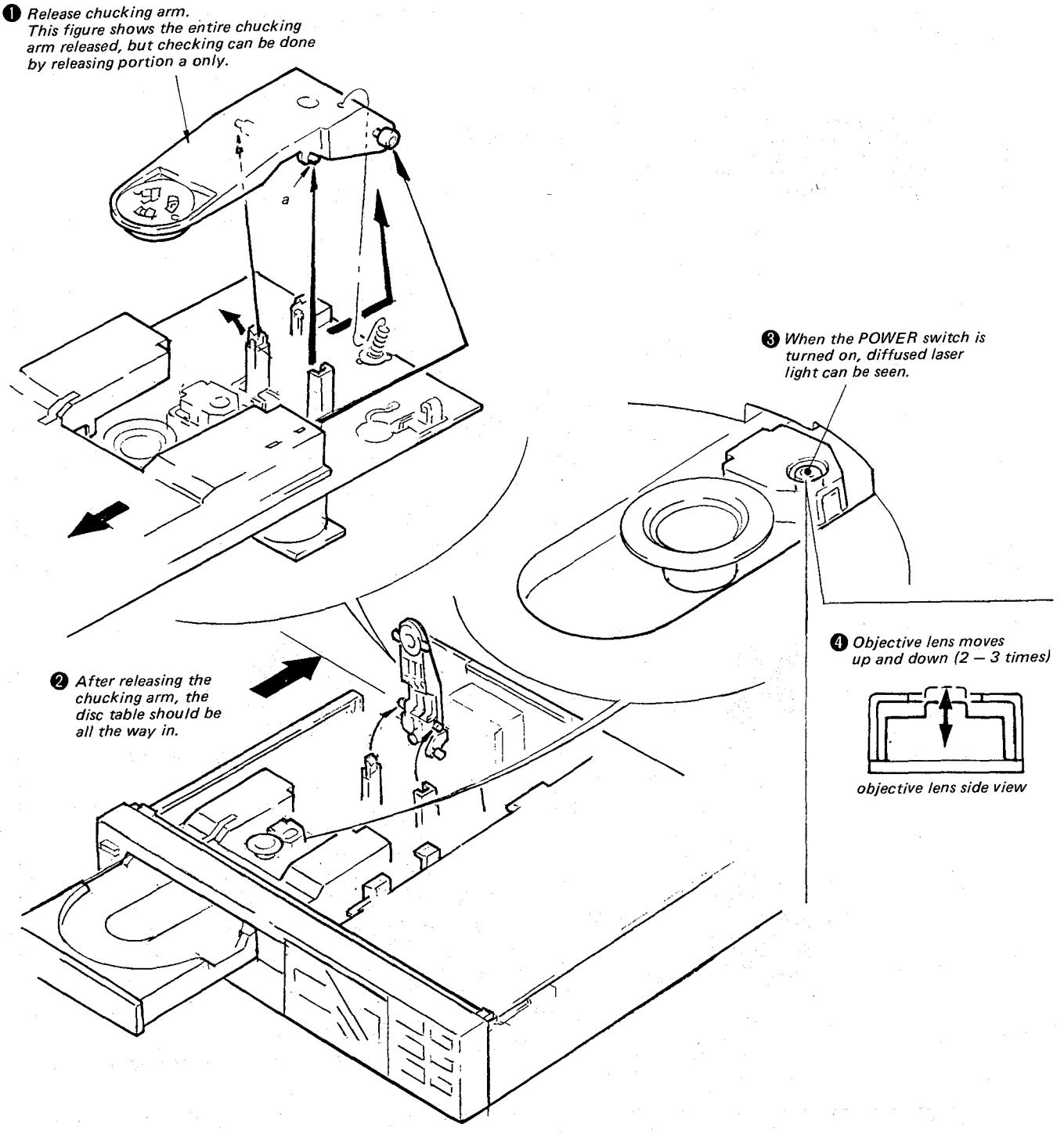


NOTES ON CHECKING LASER DIODE LIGHT EMISSION

The laser beam on this set is converged by the objective lens in the optical block so that it focuses on the disc reflective surface. Therefore, when checking light emission of the laser diode, be sure to keep the eyes more than 30 cm away from the objective lens.

CHECKING LASER DIODE AND FOCUS SEARCH OPERATION

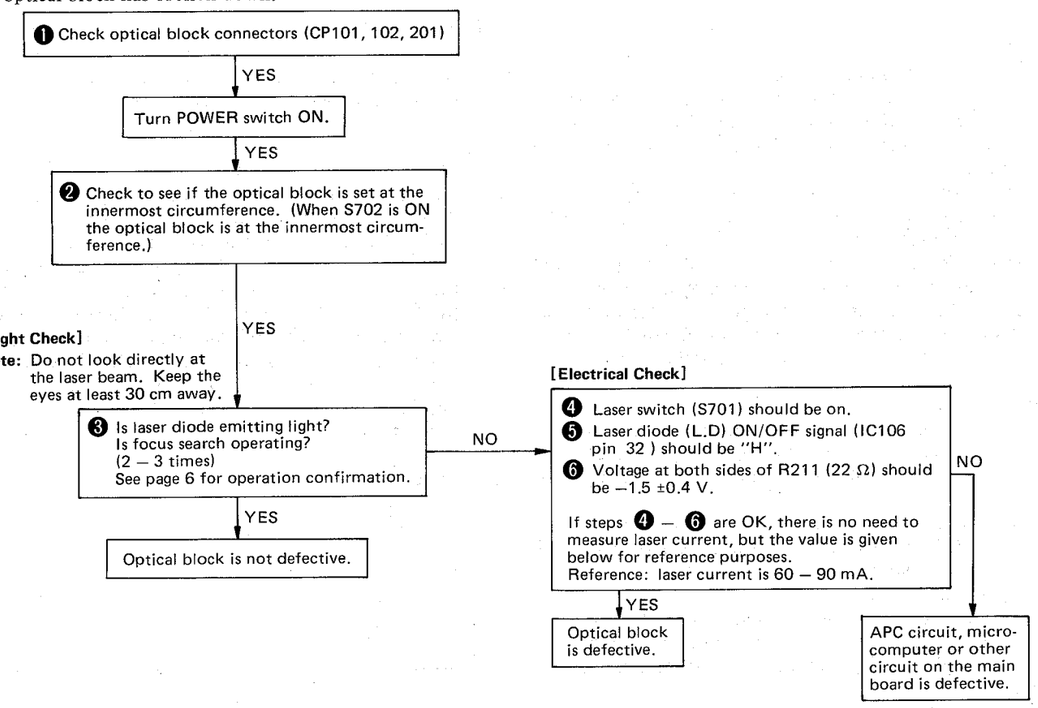
Check if the following operation is performed by looking at the objective lens after releasing the chucking arm and turning the POWER switch on. (Optical block should be at the innermost circumference when checking.)


❶ Release chucking arm.
This figure shows the entire chucking arm released, but checking can be done by releasing portion a only.
a
❷ After releasing the chucking arm, the disc table should be all the way in.
❸ When the POWER switch is turned on, diffused laser light can be seen.
❹ Objective lens moves up and down (2 – 3 times)
objective lens side view

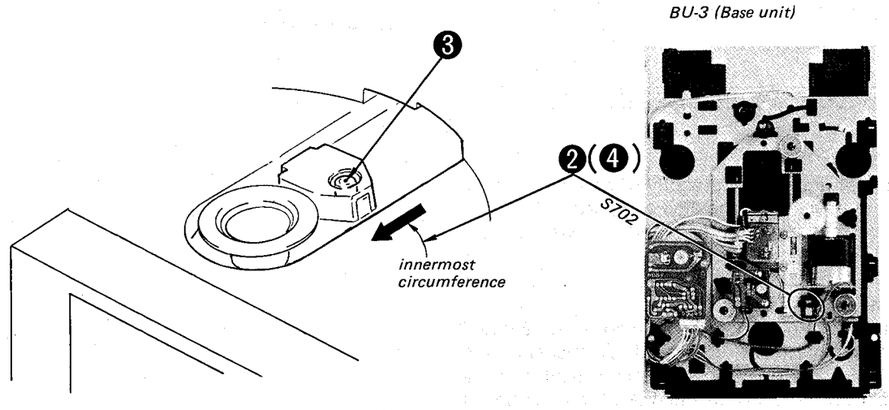
CDP-30

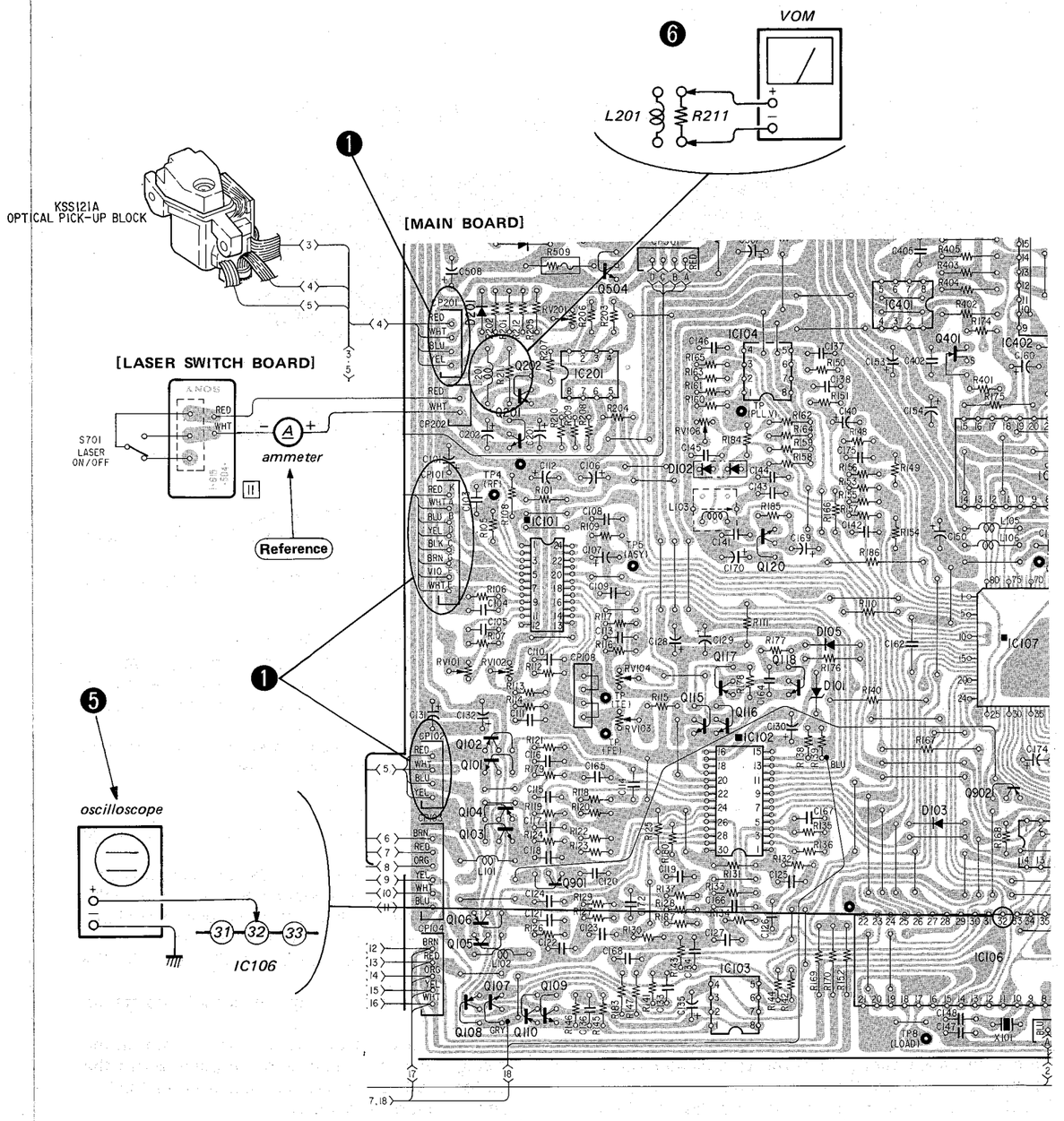
DIAGNOSIS OF OPTICAL BLOCK (KSS-121A) BREAKDOWN

1. Follow the procedure below to determine if the optical block has broken down.


❶ Check optical block connectors (CP101, 102, 201)
YES
Turn POWER switch ON.
YES
❷ Check to see if the optical block is set at the innermost circumference. (When S702 is ON the optical block is at the innermost circumference.)
YES
[Sight Check]
Note: Do not look directly at the laser beam. Keep the eyes at least 30 cm away.
❸ Is laser diode emitting light?
Is focus search operating?
(2 – 3 times)
See page 6 for operation confirmation.
NO
YES
Optical block is not defective.
[Electrical Check]
❹ Laser switch (S701) should be on.
❺ Laser diode (L.D) ON/OFF signal (IC106 pin 32) should be "H".
❻ Voltage at both sides of R211 (22 Ω) should be –1.5 ±0.4 V.
If steps ❹ – ❻ are OK, there is no need to measure laser current, but the value is given below for reference purposes.
Reference: laser current is 60 – 90 mA.
NO
YES
Optical block is defective.
APC circuit, micro-computer or other circuit on the main board is defective.

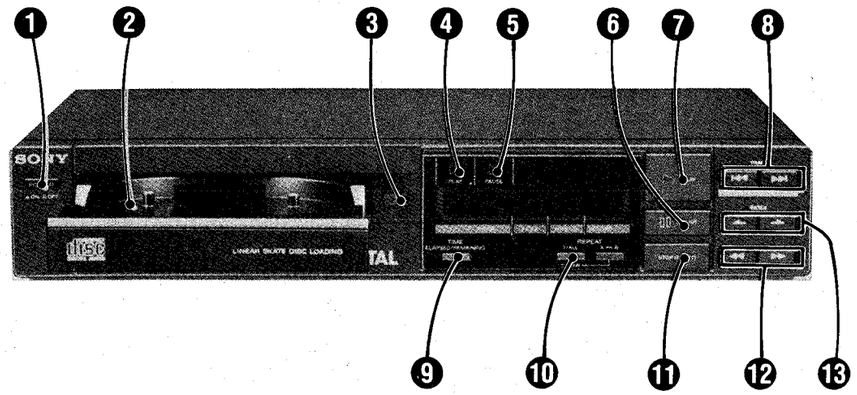
2. The checking locations listed above are shown here.





LOCATION AND FUNCTION OF CONTROLS

Before plugging in or attempting to operate this unit, it is suggested that you familiarize yourself with all its switches and controls and the purpose of each.
Each number in the photo is keyed to the descriptive text.



❶ POWER switch
Depress to turn on the power (⎍ ON). To turn the power off, press the switch again (⎍ OFF).

❷ Disc compartment
To open the disc compartment, press the OPEN/CLOSE key ❸. Place a compact disc in the compartment. To close the disc compartment, press the compartment itself, the OPEN/CLOSE key ❸ or the ▶ PLAY key ❼.

❸ OPEN/CLOSE key
With one touch of this key, the disc compartment opens for disc loading. The DISC indicator will flicker while the compartment is opening. With another touch the compartment closes.

❹ ▶ PLAY indicator
When the ▶ PLAY key ❼ is pressed, this indicator illuminates.

❺ ❚❚ PAUSE indicator
When the ❚❚ PAUSE key ❻ is pressed, this indicator illuminates.

❻ ❚❚ PAUSE key
Press to pause during play. The ❚❚ indicator will illuminate. To release the pause mode, press this key again. The indicator will go off and disc play will resume.

❼ ▶ PLAY key
Press to start normal disc play. The ▶ indicator will illuminate.

❽ AUTOMATIC MUSIC SENSOR keys
|◀◀ (back selection) : Press to go back to a **previous selection.**
▶▶| (forward selection): Press to skip ahead to a **later selection.**

❾ ELAPSED/REMAINING TIME button
The time counter normally indicates elapsed time.
When this button is pressed, the time counter shows the time remaining before the end of the last selection, preceded by a minus sign.
When this button is pressed a second time, the time counter reverts to the elapsed time.

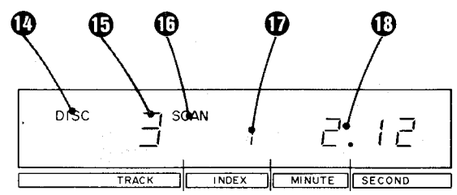
❿ REPEAT programming buttons
Press these buttons to program repeat play of the disc.
1/ALL/CLEAR: To repeat the selection currently being played, press this button once. To repeat all the selections on the disc, press the button again.To release repeat play, press the button again.
The selected repeat mode is displayed in the display window.
A ↔ B: To repeat play between specific points on the disc.
With one touch of this button the indicator in the display window flickers and the point where the button has been pressed is memorized as the "A" (start) point of repeat play.
With another touch, the indicator illuminates steadily and the point where the button has been pressed a second time is memorized as the "B" (end) point of repeat play.
When the 1/ALL/CLEAR button is pressed, this repeat play will be cancelled.

⓫ STOP (RESET) key
When this key is pressed, disc play is reset to the very beginning of the first selection and the player stands by.

⓬ Manual search keys
Keep the appropriate key pressed to search for a particular point on the disc during either play or pause.
You can monitor the disc sound reproduced in forward or in reverse at a high speed while searching during play.
When you release this key, normal-speed play will resume (during play) or the player will return to the pause mode (during pause).
◀◀ : To go backwards at a high speed (several times higher than the normal playing speed).
▶▶ : To skip ahead at a high speed (several times higher than the normal playing speed).
In the pause mode, the search speed is tripled.

⓭ INDEX keys
Press one of these keys to search for a particular index number so that playback can begin at that point. Index numbers will be displayed in the display window.
When a key is pressed and immediately released, the index number will increase or decrease by one. When the key is kept depressed, the index number will change continuously.
If a key is pressed during playback of a disc on which no index numbers have been recorded, playback will begin from the beginning of the current selection.

Display window



⓮ DISC indicator
The indicator illuminates steadily when the disc compartment is open, when the disc compartment is closed with a disc in place (in the standby mode), or when the disc is playing.

⓯ TRACK indicator
When the disc is placed in the disc compartment and the disc compartment is closed by pressing the OPEN/CLOSE key or the disc compartment, this indicator shows for a few seconds the total number of the selections recorded on the disc.
During play, this indicator shows the track number of the selections being played.

⓰ SCAN indicator
This indicator illuminates while the player is searching for the point on the disc you have programmed.

⓱ INDEX indicator
If index signals are recorded on the disc to allow significant parts of a program to be easily located, the index numbers are shown here.

⓲ Time counter
When the disc is placed in the disc compartment and the disc compartment is closed by pressing the OPEN/CLOSE key or the disc compartment, this indicator shows for a few seconds the total playing time of the disc. During play, this time counter shows the location in a particular selection by means of actual elapsed time. When the ELAPSED/REMAINING TIME button is pressed, the time counter shows how much playing time is left on the disc. The first two digits of the counter show playing time of the selection in minutes, and the last two digits show the seconds.

Rear panel

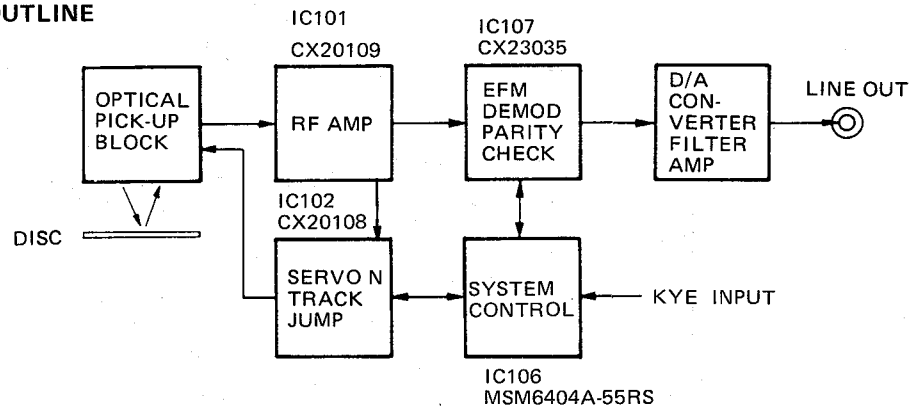
⓳ LINE OUT jacks
These jacks can be connected to the CD or auxiliary input jacks of an amplifier using the supplied connecting cord.

⓴ AC power cord

SECTION 1
OUTLINE

CIRCUIT DESCRIPTION

1-1. OUTLINE



Above block diagram shows configuration of this set. Master control IC106 serves as the center of all operation. System control IC assumes interface between man and machine like key input and remote control input.

For example, if PLAY button is pressed from key input, system control IC works in routine operation to make PLAY mode. It gives every kind of commands for IC102, 107 and they are in PLAY mode.

Through IC102 and IC107 use common data bus, they distinguish a command for IC102 or IC107 by a higher rank 4 bit value of each command from system control IC106.

Command for IC102: higher rank 4 bit 0000-0011 (0-3 with sexadecimal number system) are used.

Command for IC107: higher rank 4 bit 1010-1110 (A-E with sexadecimal number system) are uesd.

IC102 controls servo (focus, tracking, sled) mainly. IC107 checks EFM demodulation and CRC.

1-2. SIGNAL FLOW

The compact disc player applies a laser beam to the pits on the compact disc, which represent recorded music information, and extracts the changes in the reflected light and converts them into analog signals.

The following is an explanation of the signal flow on this model.

The changes in laser light reflection are extracted as current changes by the pick-up section photodiode. (The current flow changes according to the amount of light hitting the photodiode.) This signal is applied to IC101 RF amp. At the same time, tracking error and focus error detection is done by the photodiode, and those signals are also applied to the RF amp.

The signal is amplified at IC101 and output from pin ⑳. This signal is called the EFM signal, and besides music data, includes time and location data called the sync signal and Q data, as well as CRC check signal and others.

This signal is applied to IC107, and these signals are written in to the RAM all at once. Next the signals are read out from this RAM and divided into the different types of data mentioned above.

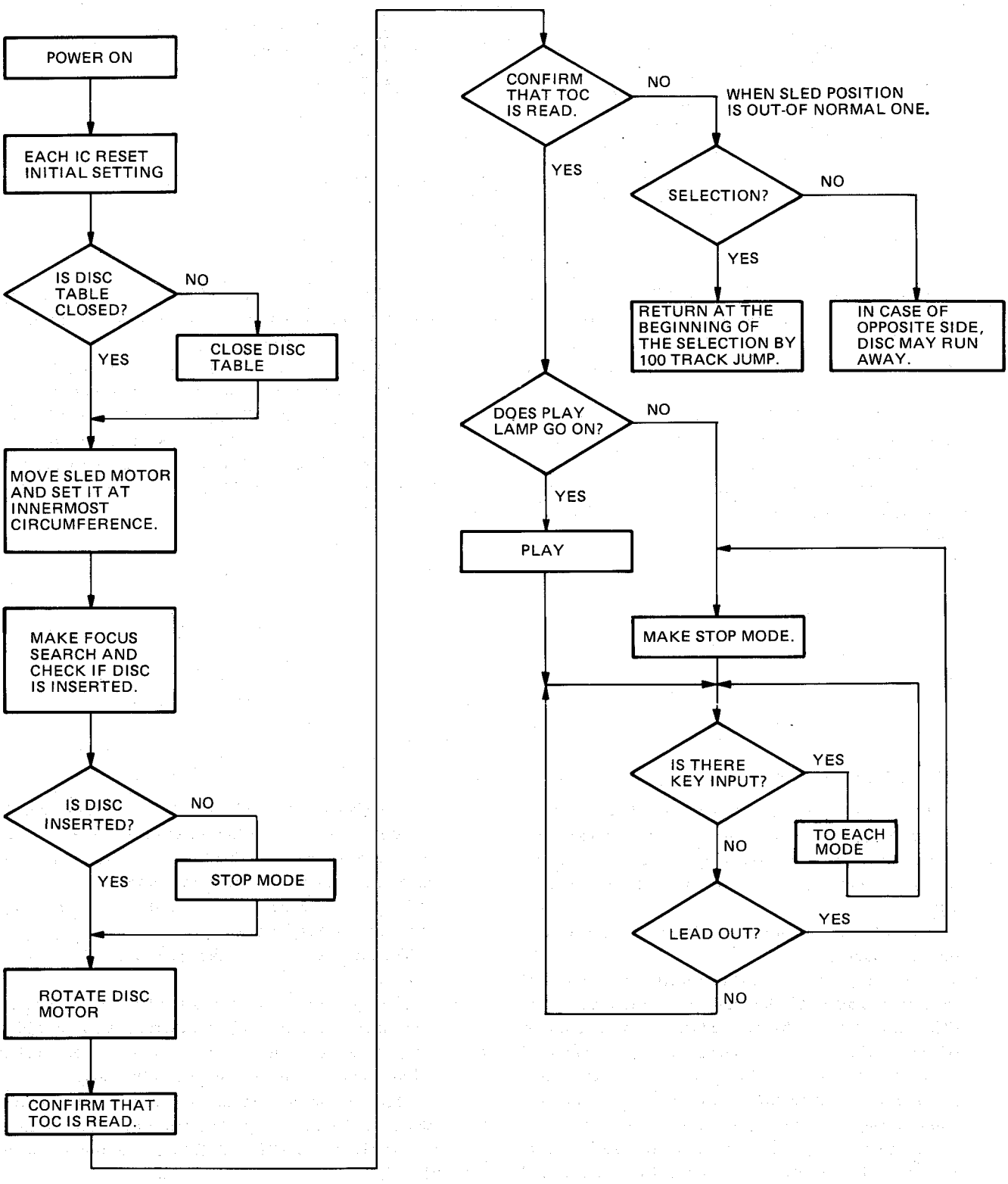
Then CRC check is done and if there are any errors they are corrected.

The music data only is then sent out to IC109 D/A converter.

The D/A converter on this model is the integrated type, and integrates a uniform current at a time width in proportion to input data, to obtain an analog voltage value which corresponds to the data.

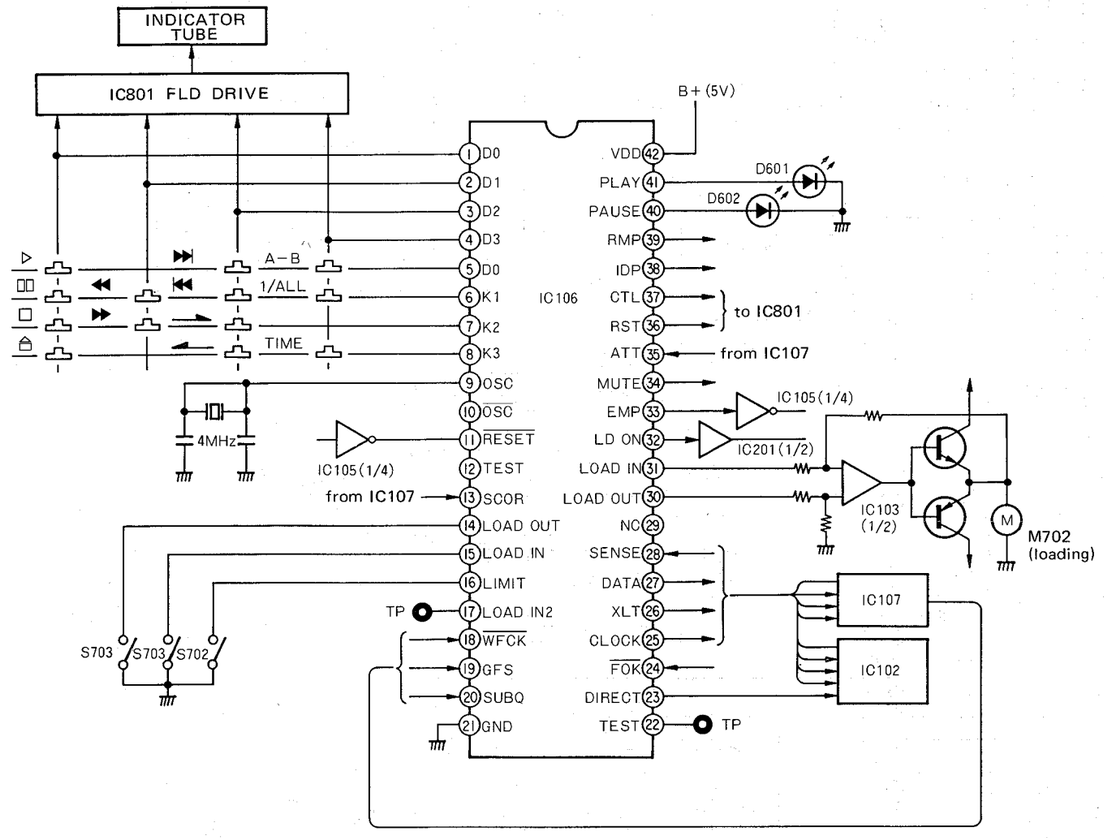
This voltage is sample extracted at the analog switch and applied to the low pass filter. This is done alternately for L-CH and R-CH, and the music is played.

The illustration below shows flow chart of simple operation after power is ON.



1-3. IC106

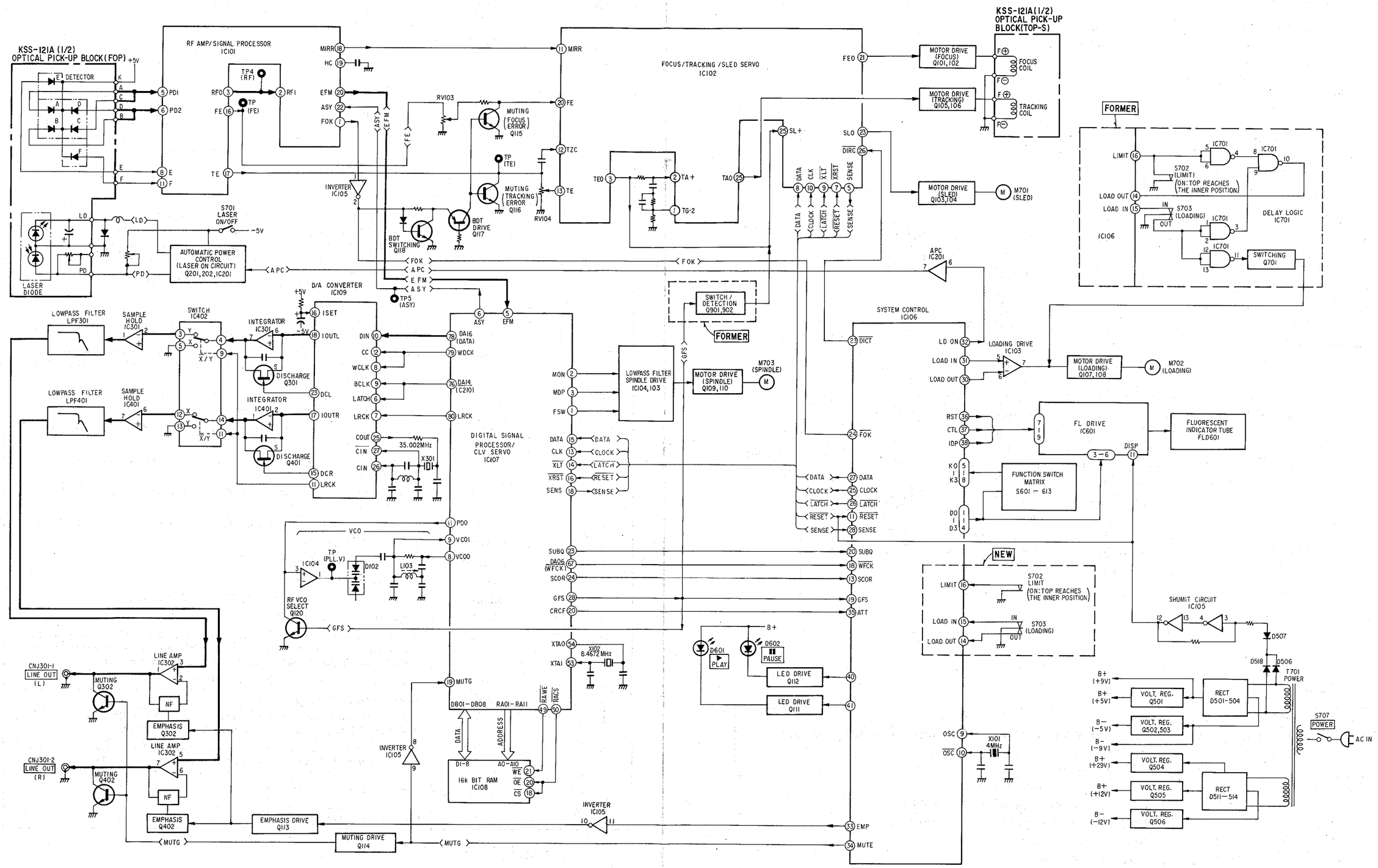
IC106 (MSM6406A-55RS) is a 4 bit system controller, and performs digit signal output to the function keys, SUBQ signal take-in and processing, display tube and servo system control, etc. The pin functions are shown in the diagram below.



Pin Functions

Pin No.	I/O	Symbol	Function
1 – 4	OUT	D0/S0 – D3/S3	Function key digit signal output pin and data output pin to display tube drive IC (M54940P).
5 – 8	IN	KEY 0 – 3	Function key input.
9 – 10	IN	OSC_0 – $\overline{OSC_1}$	Clock input pin (crystal oscillator 4.0 MHz).
11	IN	$\overline{RESET}$	Reset input pin. Input during power on and initializes.
12	–	TEST	Test pin when microcomputer is shipped. Normally open.
13	IN	SCOR	SUBQ sync signal input pin.
14	IN	OUT SW	Detects disc table open.
15	IN	IN SW	Detects disc table closed.
16	IN	LIMIT SW	Detects 2-axis device in start position.
17	–	ADJ SW	Prevents focus servo from being forced ON. Normally open, grounded when observing S curve, etc.
18	IN	$\overline{WFCK}$	$\overline{WFCK}$ input pin.
19	IN	GFS	High is input here when CX23035 is reading data in correctly. When this pin goes low for more than 5 continuous seconds during play, the disc is judged as defective and is forcible ejected. However this does not occur when pin (22) is low. Also, a low pulse is generated sometimes during play, but this is not a problem.
20	IN	SUBQ	SUBQ signal input pin.
21	–	GND	Ground.
22	–	VS/TRK	Normally open, but grounded when operating the CD player in adjustment mode. When open, the CLV-A (auto mode) CLV command is applied to CX23035, and when grounded, CLV-S (run-up mode) is applied. Also, when this pin is grounded, the disc is not ejected even when pin (19) GFS is low for more than 5 continuous seconds. Also, by grounding this pin and pressing a panel switch, tracking servo can be switched as shown below. TIME : Tracking servo off, to observe traverse waveform. 1/ALL : Tracking gain up. A – B : Tracking gain normal.
23	OUT	DIRECT	Output pin to CX20108. Used when track jump state is inverted.
24	IN	$\overline{F.OK}$	Low is input here when the 2-axis device can read in data. Focusing is judged using this input and the F.Z.C. (focus zero cross) signal input to pin (28) SENSE and focus servo is turned on.
25	OUT	CLOCK	Clock output pin for sending commands to CX20108 and CX23035. Normally high level. 8 clocks are output for 1 command.
26	OUT	LATCH	Output for reporting the end of the command transmission to CX20108, CX23035. Normally high level.
27	OUT	DATA	Output pin for commands to CX20108, CX23035. Commands are composed of 8 bits, 4 address bits and 4 data bits.
28	IN	SENSE	Responses return here corresponding to the commands sent to CX20108 and CX23035 after the commands are executed.
29	–	NC	Empty pin. Normally open, but timer play is enabled by grounding this pin (option).
30	OUT	LOAD OUT	Output to open disc table.
31	OUT	LOAD IN	Output to close disc table.
32	OUT	LD. ON	Output to turn laser diode on.
33	OUT	EMPHASIS	Outputs and switches analog circuit by EMPHASIS signal within the SUBQ signal.
34	OUT	MUTE	Outputs digital mute to CX23035.
35	IN	CRCF	Results of matching SUBQ signal twice are input from CX23035. Goes high when matched, low when not matched. By using this pin, matching twice operation is not needed inside the microcomputer and access processing, etc. is easier.
36	OUT	RST	Reset output to display tube drive IC (M54940P).
37	OUT	CTL	Clock output to display tube drive IC (M54940P).
38	OUT	IDP	Output for character data lighting up to display tube driver IC (M54940P). This turns "DISC", "SCAN", etc. inside the display tube ON/OFF.
39	OUT	CDP. CTL	Signal output pin for direct function. Outputs high for 600 msec when PLAY button is turned ON when the CD player is in STOP state (including EJECT).
40	OUT	PAUSE	Function key display lamp output.
41	OUT	PLAY	
42	–	Vcc	Power supply input pin.

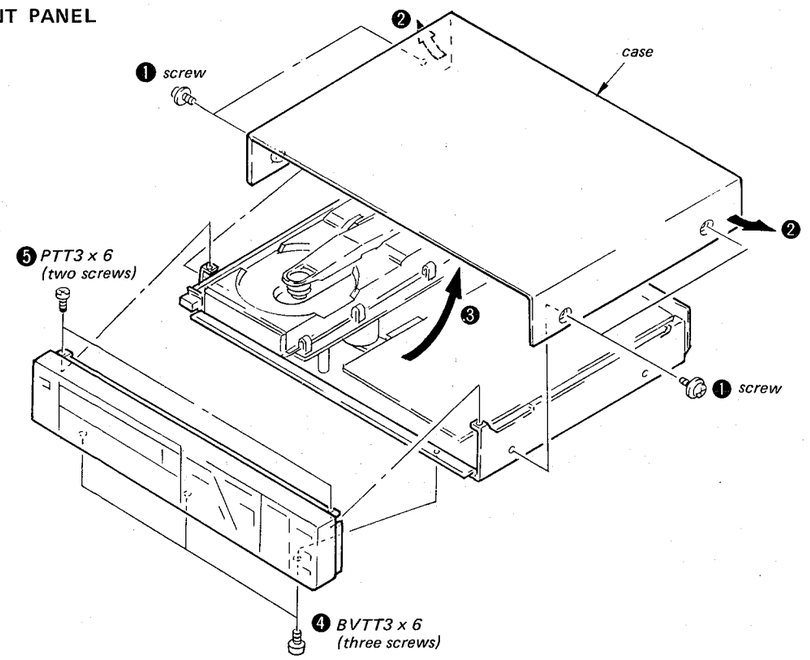
1-4. BLCOK DIAGRAM



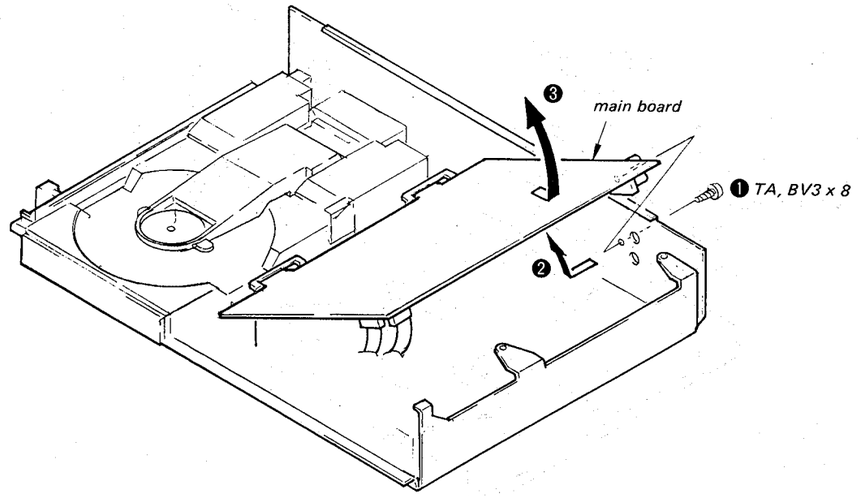
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

CASE, FRONT PANEL

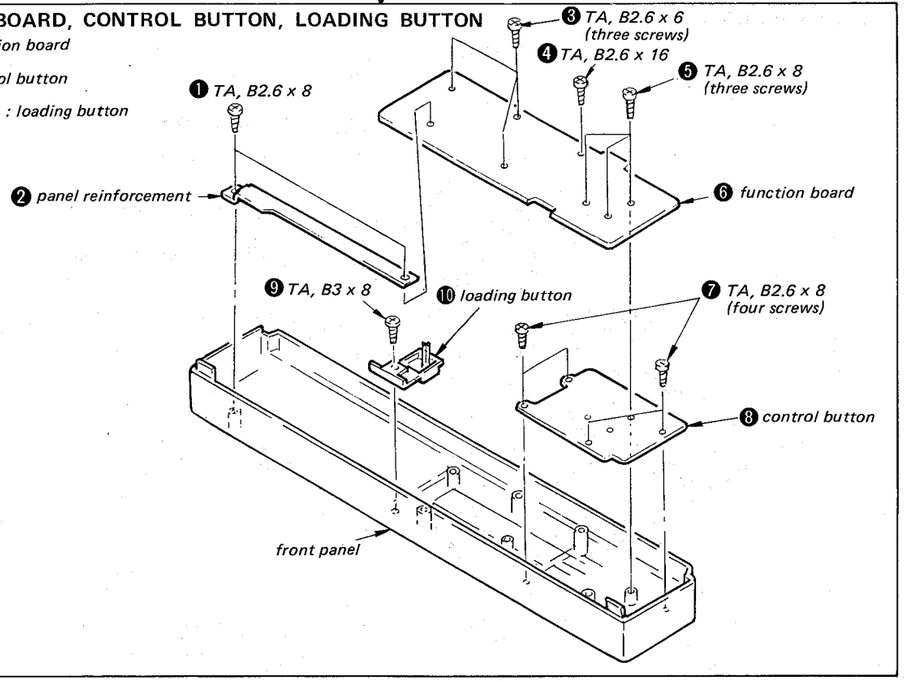


MAIN BOARD

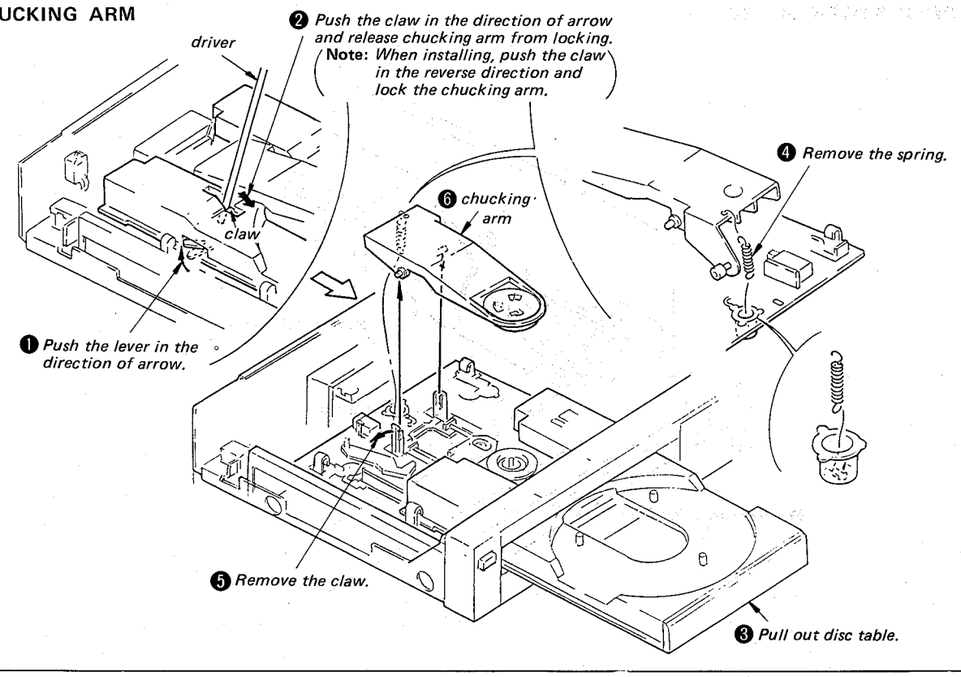


FUNCTION BOARD, CONTROL BUTTON, LOADING BUTTON

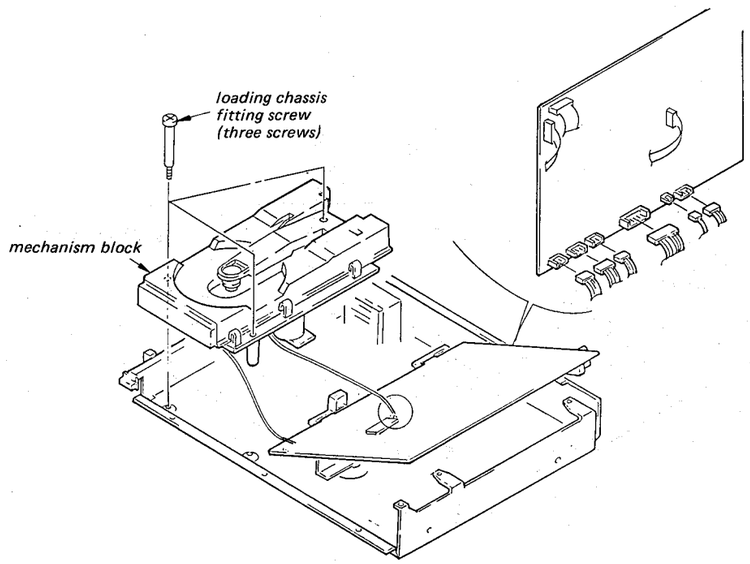
❶ – ❻ : function board
❶ – ❽ : control button
❶ – ❻, ❾, ❿ : loading button



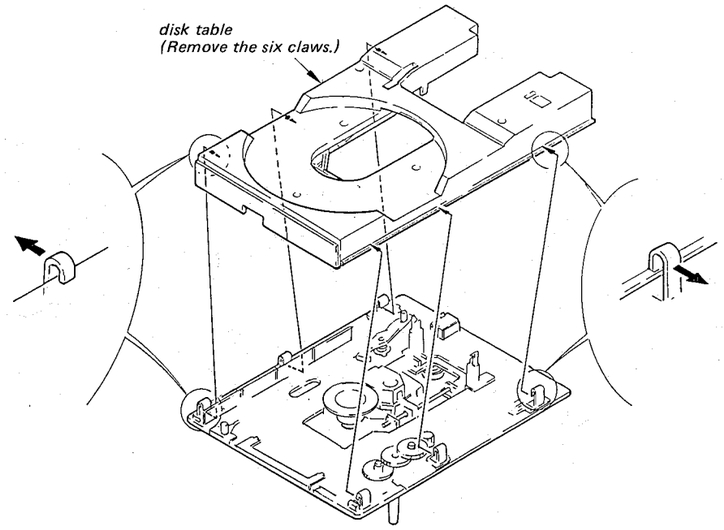
CHUCKING ARM


driver
❷ Push the claw in the direction of arrow and release chucking arm from locking.
Note: When installing, push the claw in the reverse direction and lock the chucking arm.
❹ Remove the spring.
❻ chucking arm
claw
❶ Push the lever in the direction of arrow.
❺ Remove the claw.
❸ Pull out disc table.

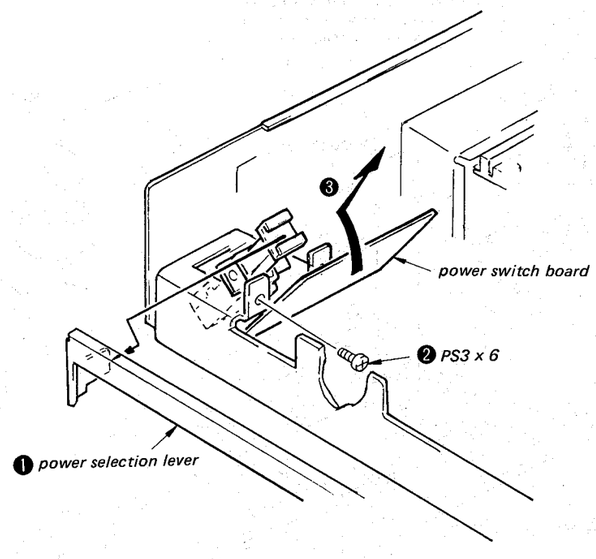
MECHANISM BLOCK



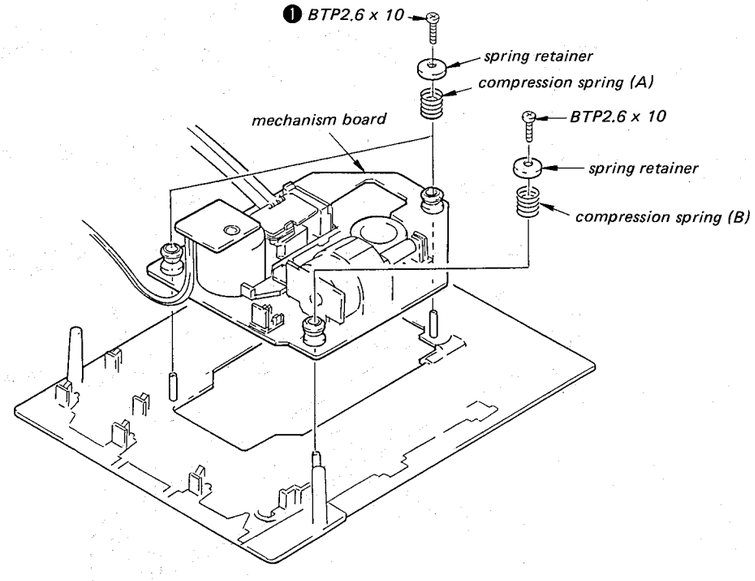
DISK TABLE



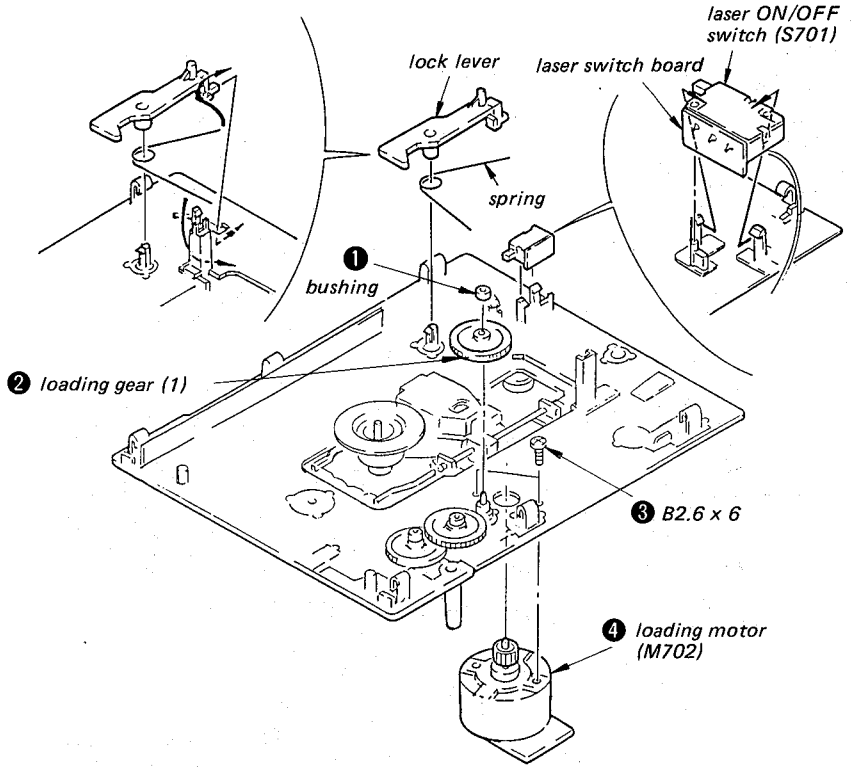
POWER SWITCH BOARD



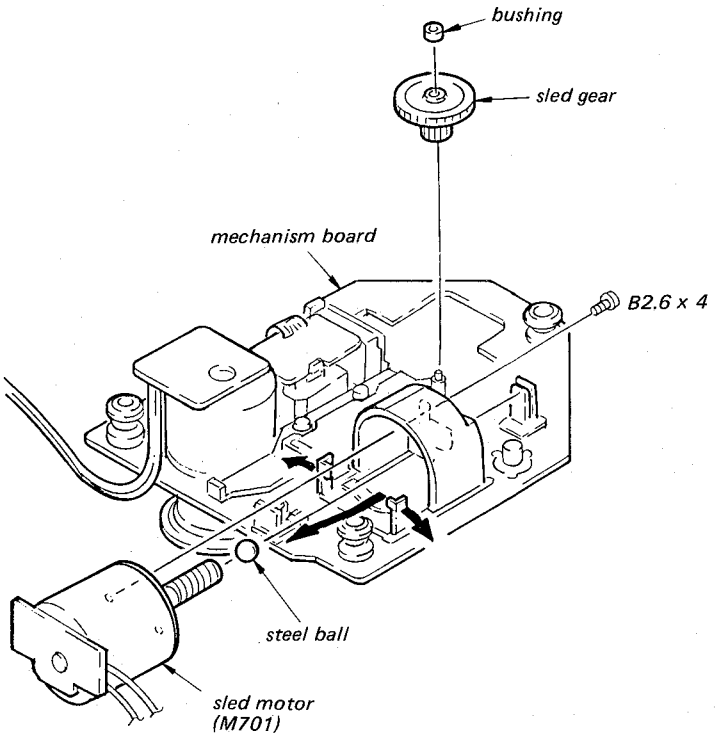
MECHANISM BOARD

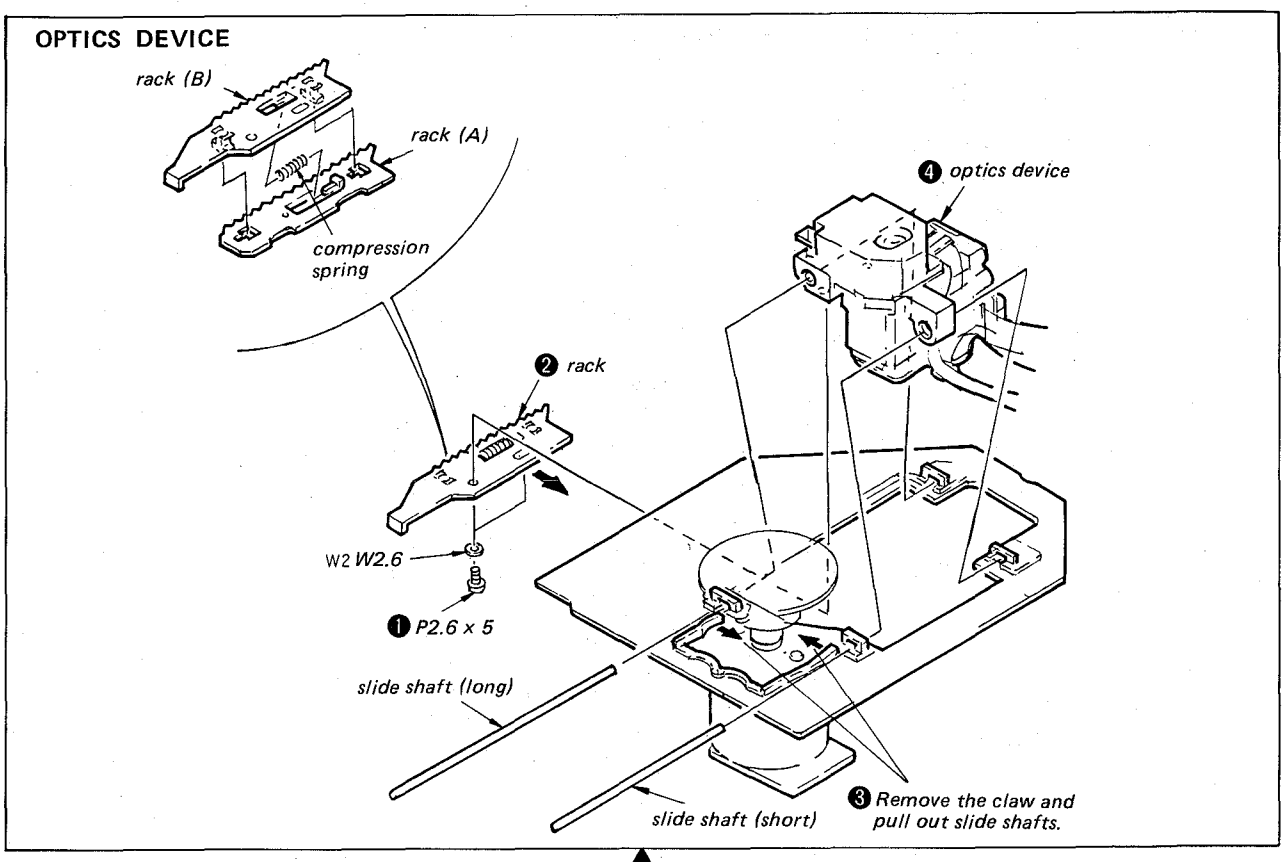


LOADING MOTOR (M702), LD SWITCH BOARD, LOCK LEVER



SLED MOTOR




OPTICS DEVICE
rack (B)
rack (A)
compression spring
❹ optics device
❷ rack
W2 W2.6
❶ P2.6 x 5
slide shaft (long)
slide shaft (short)
❸ Remove the claw and pull out slide shafts.

SECTION 3
ADJUSTMENTS

ELECTRICAL ADJUSTMENTS

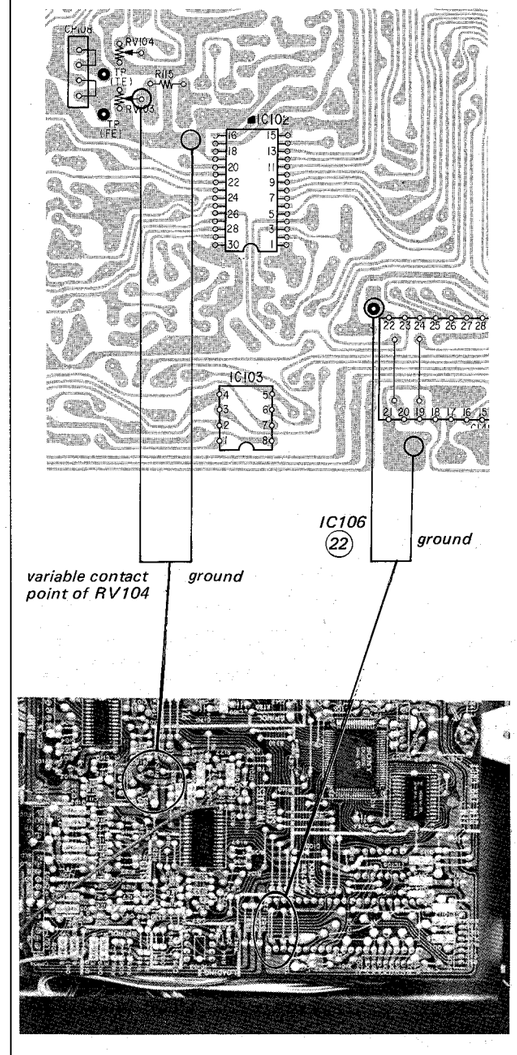
1. Perform adjustments in the order given.
2. Use YEDS-1 disc unless otherwise indicated.
3. Use the oscilloscope with more than 10 MΩ impedance.

Adjustment Mode

- Laser power adjustment (1), (3) and focus bias adjustment
  . . . . Ground IC106 pin (22) (TEST) on main board.
- E-F balance adjustment
  . . . . Ground IC106 pin (22) (TEST) and the variable contact point of RV104 (T.E) on main board.

Note: After adjustment, be sure to remove the lead wires connected above.

Adjustment Location: main board

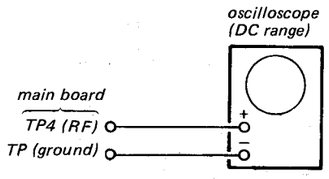


- Adjustment should be made in order of Laser power (1), Focus bias and Laser power (2).

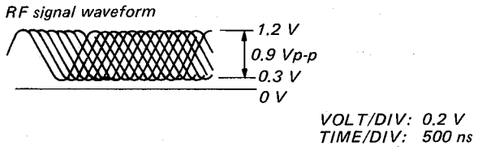
Laser Power Adjustment (1)

This adjustment should be made when replacing TOP (T-type Optical Pick-up).

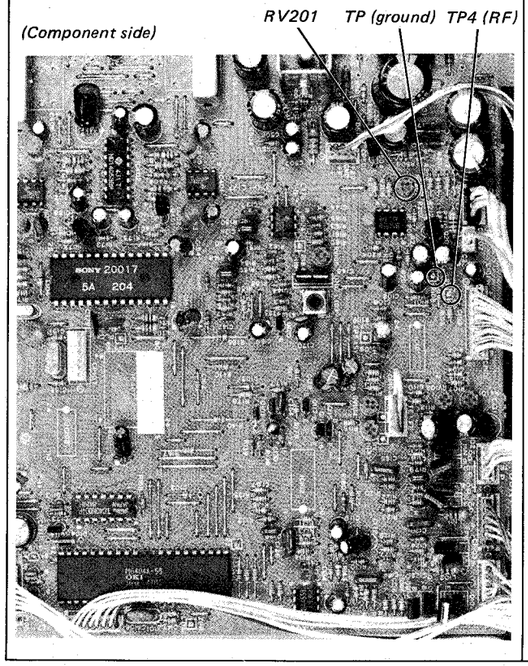
Procedure:



1. Connect oscilloscope to test points TP4 (RF) and TP(ground).
2. Put set into adjustment mode. (See page 23.)
3. Turn POWER switch on.
4. Put disc (YEDS-1) in and press ▷ button.
5. Adjust RV201 so that the waveform is as shown in the figure below.



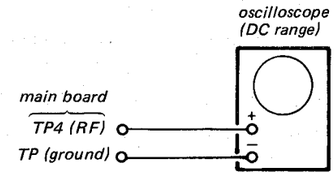
Adjustment Location: main board



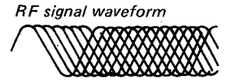
Focus Bias Adjustment

This adjustment should be made when replacing TOP (T-type Optical Pick-up).

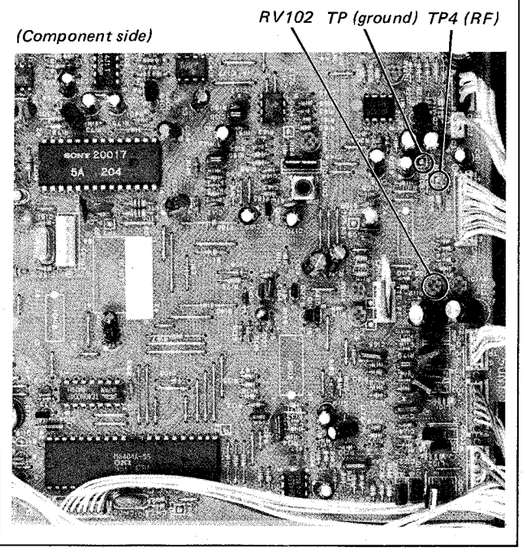
Procedure:



1. Connect oscilloscope to test points TP4 (RF) and TP (ground).
2. Put set into adjustment mode. (See page 23.)
3. Turn POWER switch on.
4. Put disc (YEDS-1) in and press ▷ button.
5. Adjust RV102 for an optimum waveform eye pattern or so that the peak is maximum. Optimum eye pattern means that shape " ◇ " can be clearly distinguished at the center of the waveform.



Adjustment Location: main board



Laser Power Adjustment (2)

This adjustment should be made when replacing TOP (T-type Optical Pick-up).

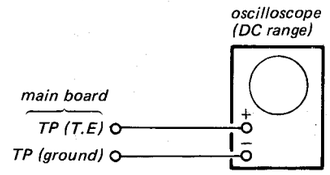
After laser power adjustment (1) and focus bias adjustment (2), check laser power agian.

1. Check the waveform by the same procedure of laser power adjustment (1) on page 24.
2. If it is out of specification, adjust RV201 again.
3. After check or adjustment, cancel the adjustment mode. (See page 23.)

E-F Balance Adjustment

This adjustment should be made when replacing TOP (T-type Optical Pick-up).

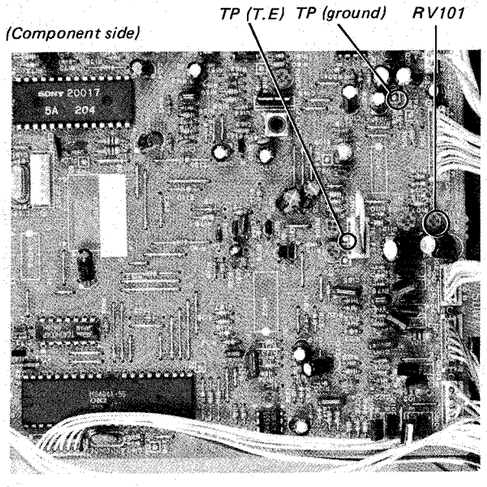
Procedure:



1. Connect oscilloscope to test point TP (T.E) and TP (ground).
2. Put set into adjustment mode. (See page 23.)
3. Turn POWER switch on.
4. Put disc (YEDS-1) in and press ▷ button.
5. Adjust RV101 so that the traverse waveform is symmetrical above and below.
6. After adjustment, cancel the adjustment mode. (See page 23.)

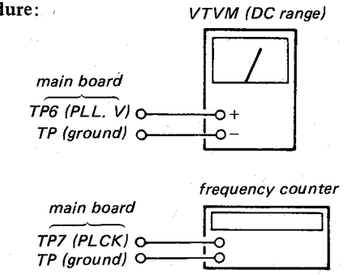
VOLT/DIV: 1 V
TIME/DIV: 1 ms

Adjustment Location: main board



RF PLL Frequency Adjustment /Lock Frequency Check

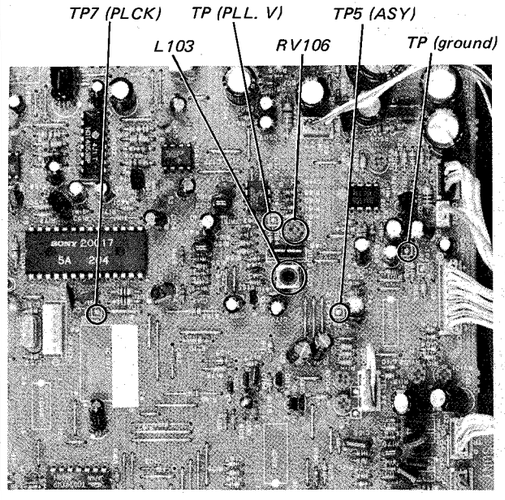
Procedure:



1. Ground test point TP5 (ASY).
2. Connect VTVM to test points TP6 (PLL.V) and TP (ground).
3. Turn POWER switch on.
4. Adjust RV106 so that the reading on VTVM is 0 ±50 mV.
5. Connect the frequency counter to test points TP7 (PLCK) and TP (ground).
6. Adjust L103 so that the reading on frequency counter is 4.2818 MHz.
   . . . . (RF PLL frequency adjustment)
7. Remove lead wire connecting TP5 (ASY) and ground.
8. Put disc (YEDS-1) in and press ▷ button.
9. Confirm that the reading on frequency counter is 4.3218 MHz.

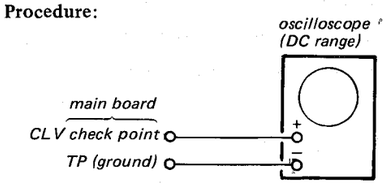
Adjustment Location: main board

(Component side)

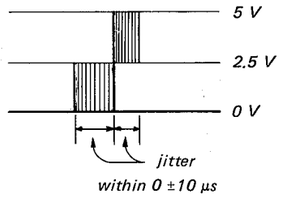


CLV Phase Lock Check

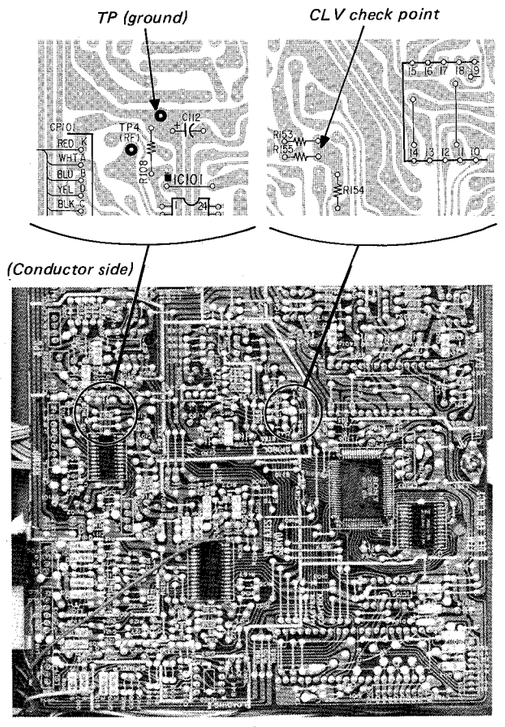
Procedure:



1. Connect oscilloscope to CLV check point (the point between IC107 pin ③ and R154) and TP (ground).
2. Turn POWER switch on.
3. Put disc (YEDS-1) in and press ▷ button.
4. Check the waveform is as shown in the figure below.



Adjustment Location: main board



REFERENCE

Focus/Tracking Gain Adjustment

A frequency response analyzer is necessary in order to perform this adjustment exactly.

However, this gain has a margin, so even if it is slightly off, there is no problem. Therefore, do not perform this adjustment.

Focus/tracking gain determines the pick-up follow-up (vertical and horizontal) relative to mechanical noise and mechanical shock when the 2-axis device operate.

However, as these reciprocate, the adjustment is at the point where both are satisfied.

- When gain is raised, the noise when the 2-axis device operates increases.
- When gain is lowered, it is more susceptible to mechanical shock and skipping occurs more easily.
- When gain adjustment is off, the symptoms below appear.

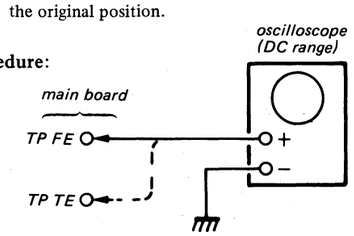
Gain / Symptoms	Focus	Tracking
• The time until music starts becomes longer for STOP →▷PLAY or automatic selection (⏮, ⏭buttons pressed. (Normally takes about 2 seconds.)	low	low or high
• Music does not start and disc continues to rotate for STOP→▷PLAY or automatic selection (⏮, ⏭buttons pressed.)	–	low
• Disc table opens shortly after STOP→▷PLAY.	low or high	–
• Sound is interrupted during PLAY. Or time counter display stops progressing.	–	low
• More poise during 2-axis device operation.	high	high

The following is a simple adjustment method.

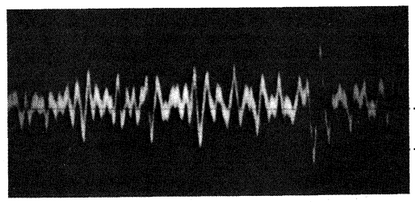
– Simple Adjustment –

Note: Since exact adjustment cannot be performed, remember the positions of the controls before performing the adjustment. If the positions after the simple adjustment are only a little different, return the controls to the original position.

Procedure:

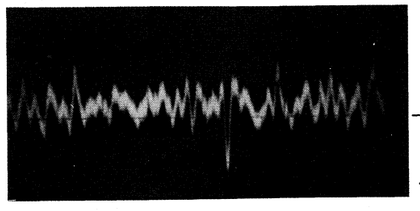


1. Keep the set horizontal.
   (If the set is not horizontal, this adjustment cannot be performed due to the gravity against the 2 axis device.)
2. Insert disc (YEDS-1) and press ▷PLAY button.
3. Connect oscilloscope to main amp board TP FE.
4. Adjustment RV103 so that the waveform is as shown in the figure below. (focus gain adjustment)

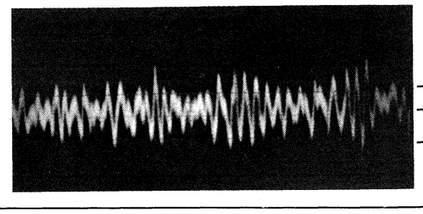


- Incorrent Examples (DC level changes more than on adjusted waveform)

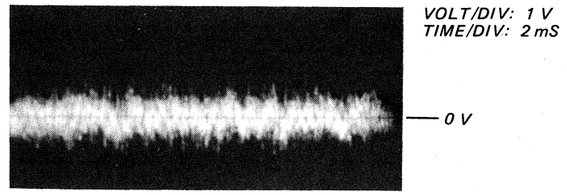
low focus gain



high focus gain

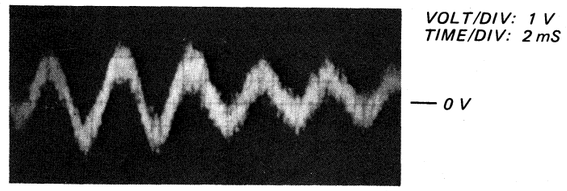


5. Connect oscilloscope to main board TP TE.
6. Adjust RV104 so that the waveform is as shown in the figure below. (tracking gain adjustment)

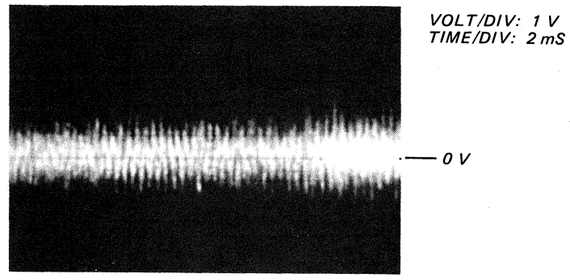


- Incorrect Examples (fundamental wave appears)

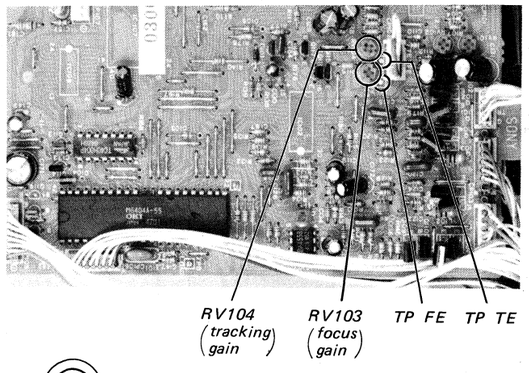
low tracking gain



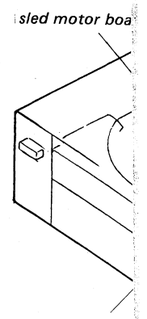
high tracking gain
(higher fundamental wave than for low gain)



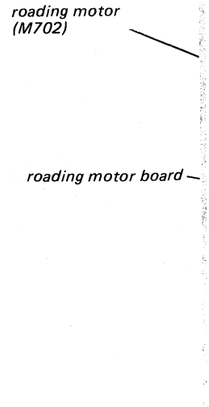
Adjustment Location: main board



CIRCUIT BOARDS LO

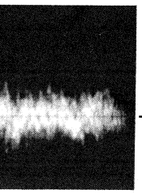


BU-3 Reference Photo
– Rear View of Base Un

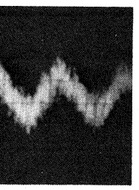


in board TP TE.

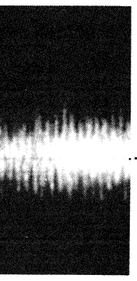
waveform is as shown in
gain adjustment)



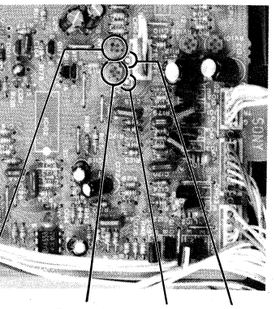
mental wave appears)



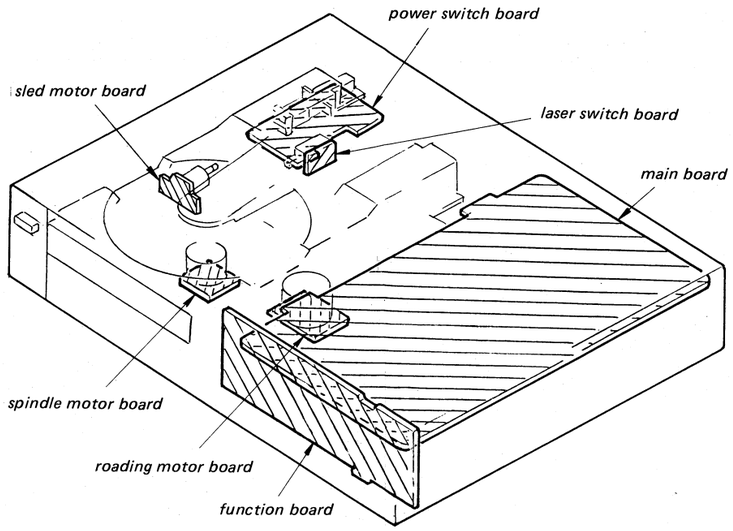
for low gain)



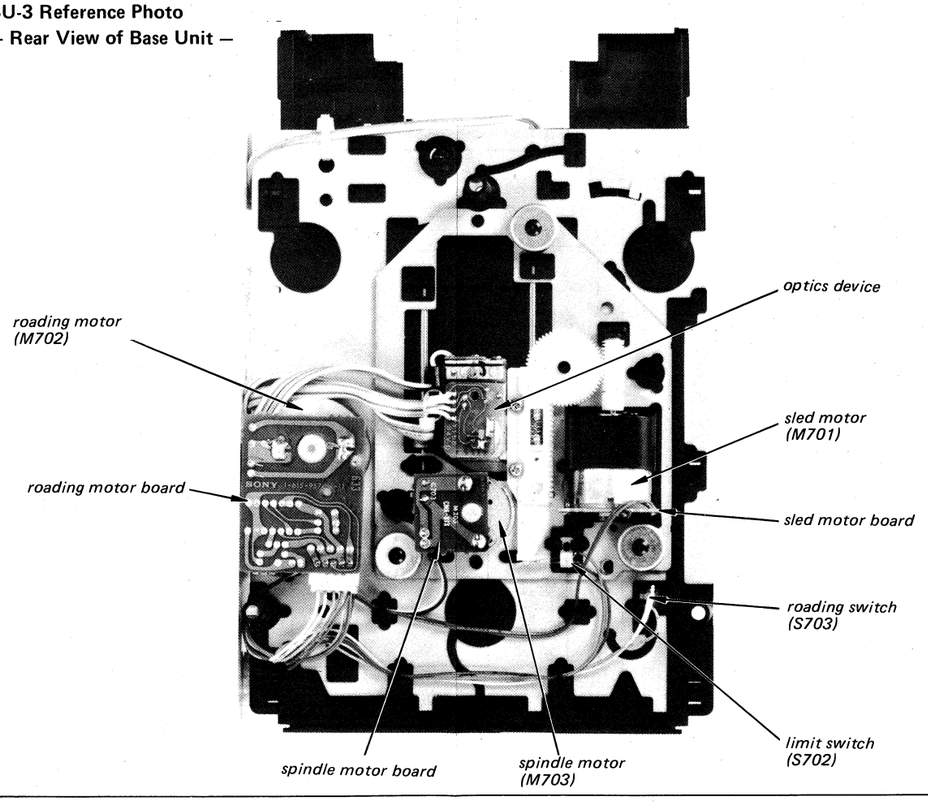
oard



CIRCUIT BOARDS LOCATION

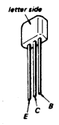


BU-3 Reference Photo
— Rear View of Base Unit —

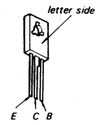


• Semiconductor Lead Layouts

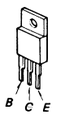
2SA1175
2SC2785-E



2SB548-R
2SD414-R



2SB834
2SD880



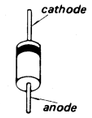
2SB734
2SD774

2SC2878

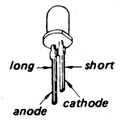
2SK152-3

DTA144ES
DTC143TS
DTC144ES

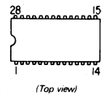
10E2
11E2
1SS202-1
HZ5CLL
HZ6B1L
HZ11A2L
HZ12B1L
HZ30-2L



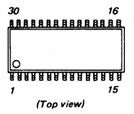
GL-5PG5
GL-5HY5



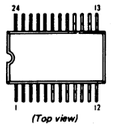
CX20017



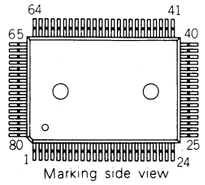
CX20108



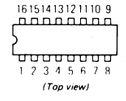
CX20109
MB8146-20LPF



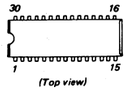
CX23035



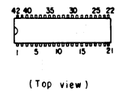
HD14053BP



M54940P

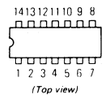


MSM6404A-55RS
MSM6404A-75RS
MSM6404A-82RS



NE5532P
TL082CP
μPC4558C

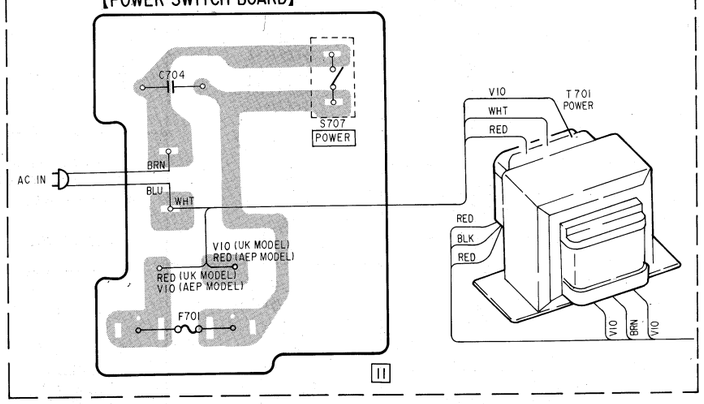
TC40H004P
TC4011BP



4-1. MOUNTING DIAGRAM

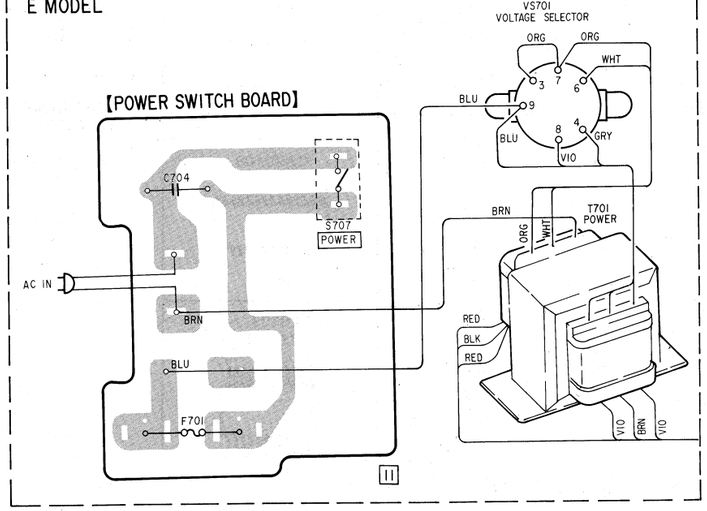
AEP, UK MODEL

【POWER SWITCH BOARD】

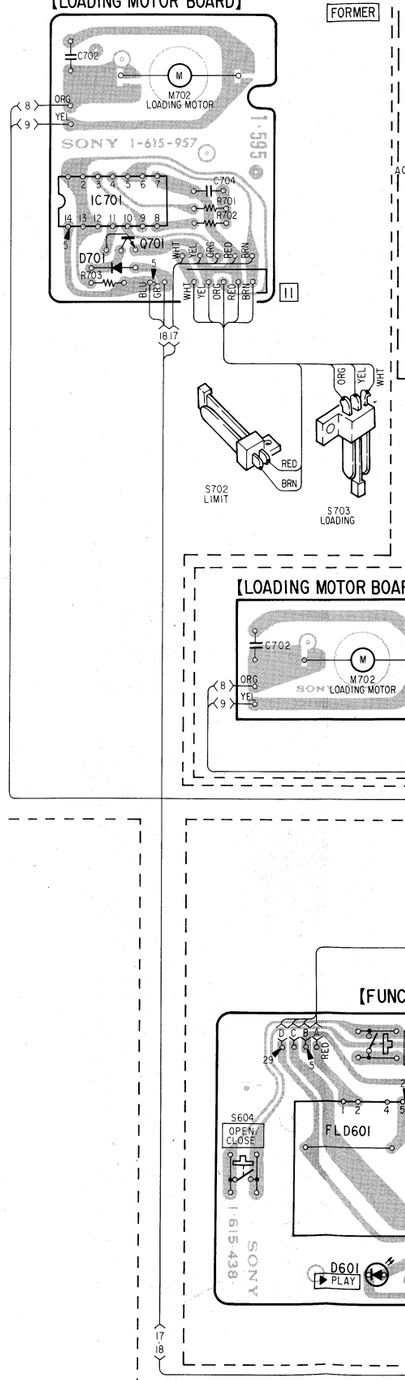


E MODEL

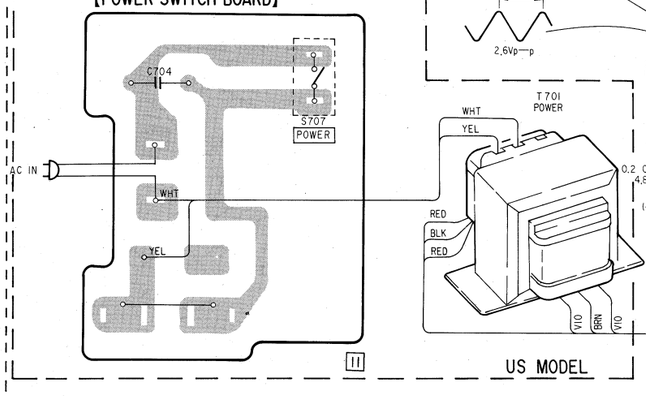
【POWER SWITCH BOARD】

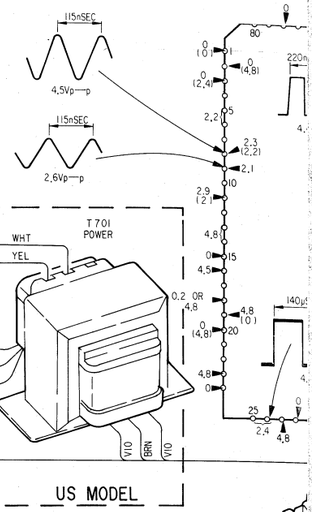


【LOADING MOTOR BOARD】 FORMER



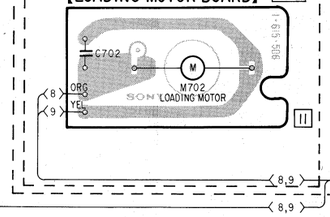
【POWER SWITCH BOARD】



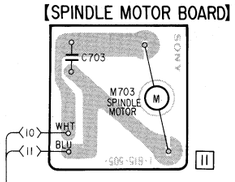


KSS121A
OPTICAL PICK-UP BLOCK

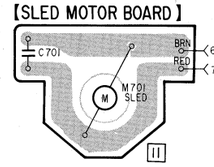
【LOADING MOTOR BOARD】 NEW



【SPINDLE MOTOR BOARD】

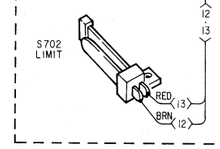


【SLED MOTOR BOARD】

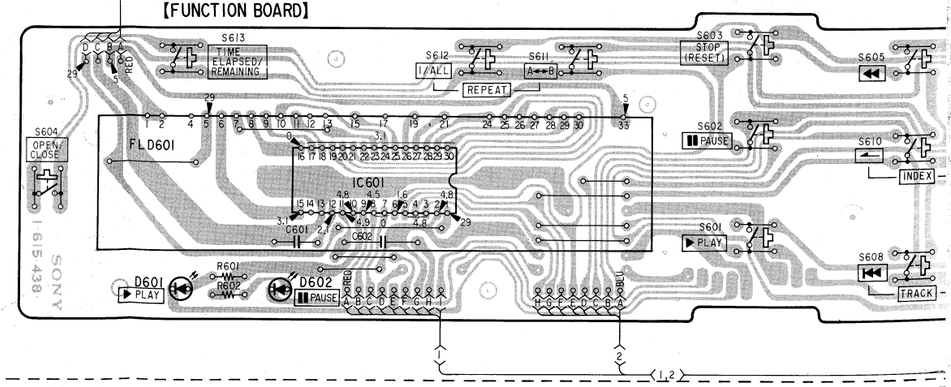


【LASE

S701
LASER
ON/OFF



【FUNCTION BOARD】



Note:

- ●—: parts extracted from the conductor side.
- ■ : part mounted on the conductor side.
- ——→—— : signal path
- ▒▒▒ : B + pattern

11 12 13 14 15 16 17 18 19 20 21 22 23

A B C D E F G H I J

【MAIN BOARD】

CNJ301 LINE OUT R L OUTPUT

T701 POWER WHT YEL RED BLK RED VIO BRN VIO

US MODEL

KSS121A OPTICAL PICK-UP BLOCK

SIGNAL INPUT

【SLED MOTOR BOARD】 M701 SLED C701

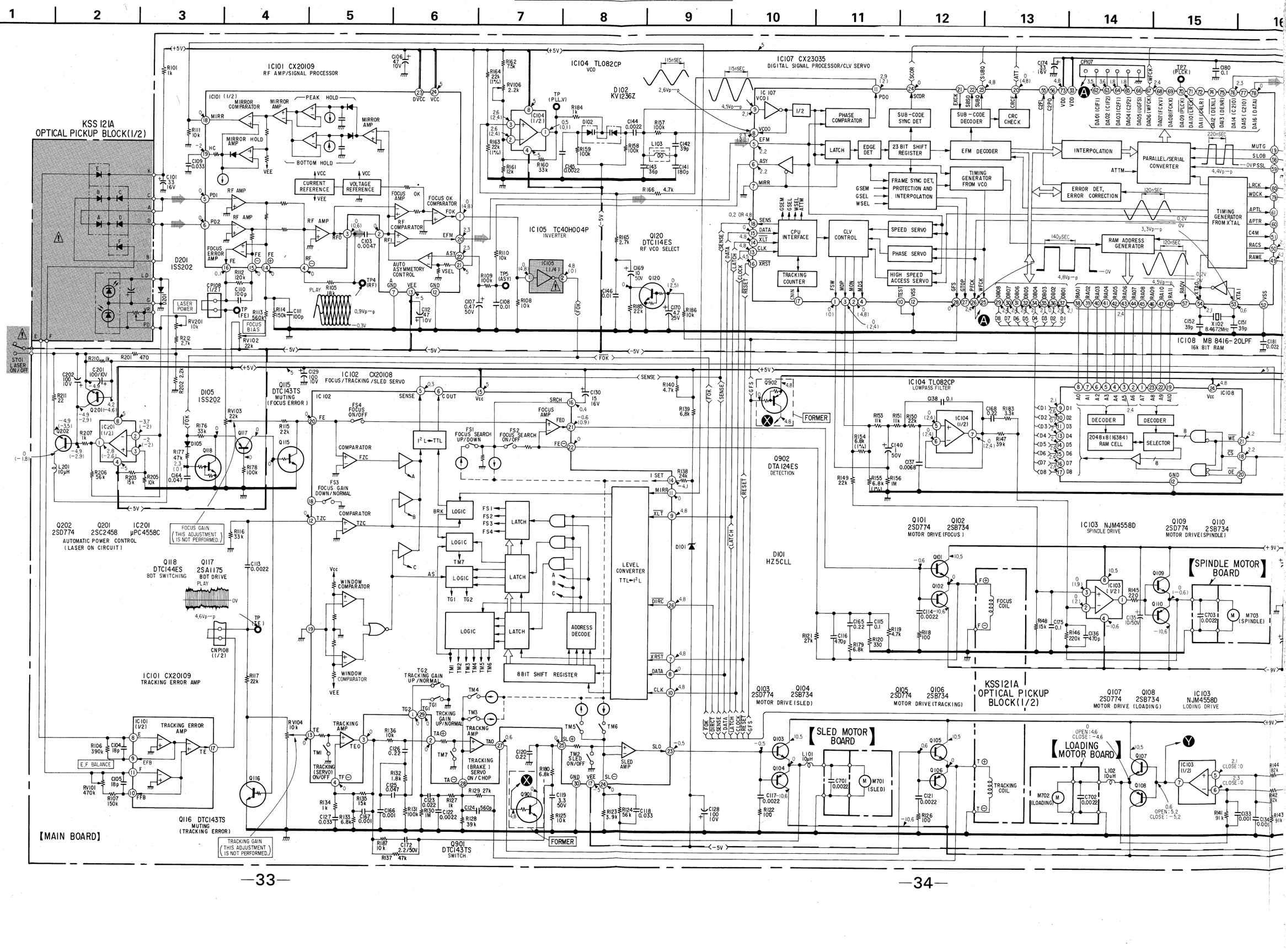
【LASER SWITCH BOARD】 S701 LASER ON/OFF

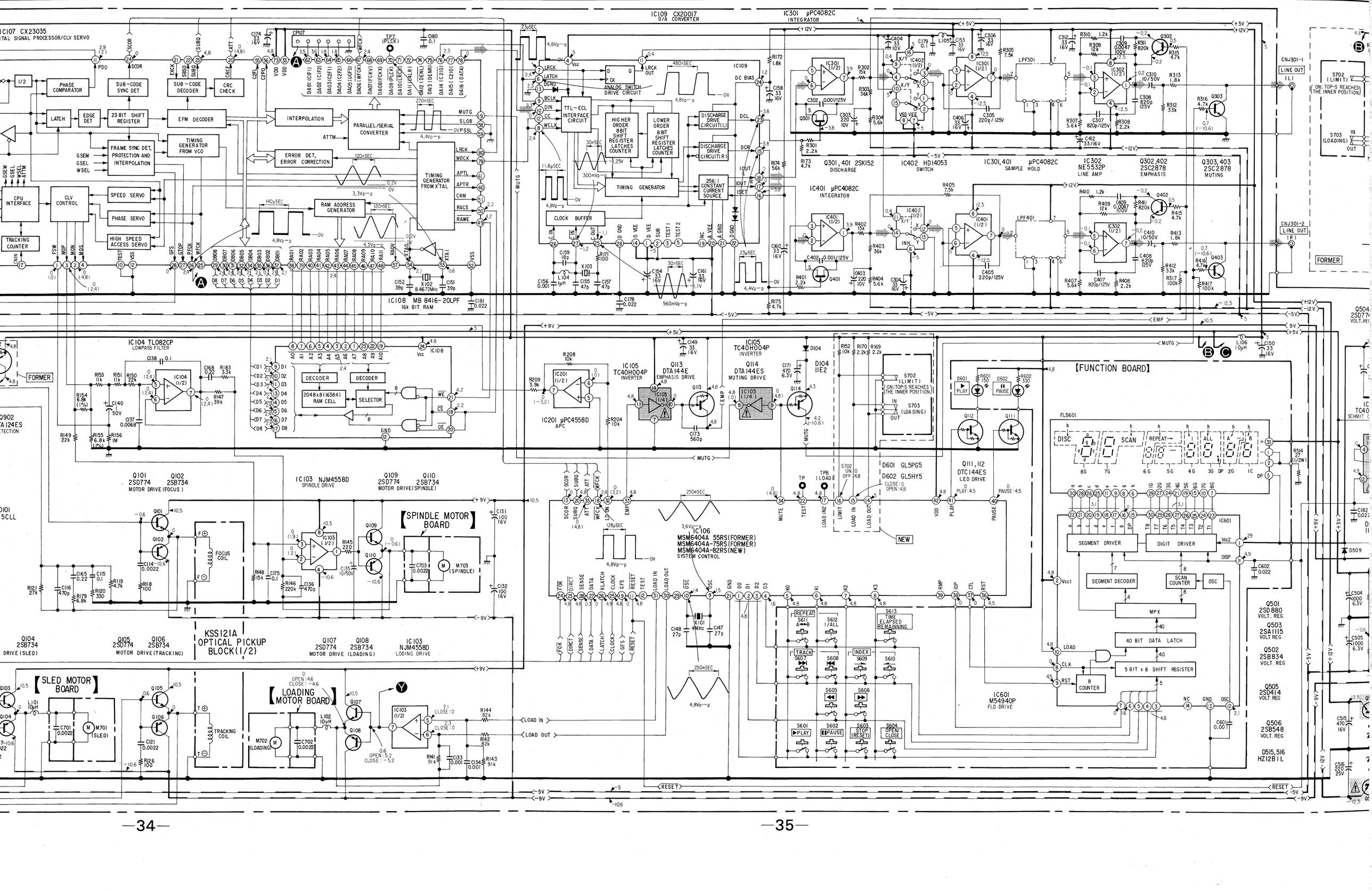
S702 LIMIT S703 LOADING NEW

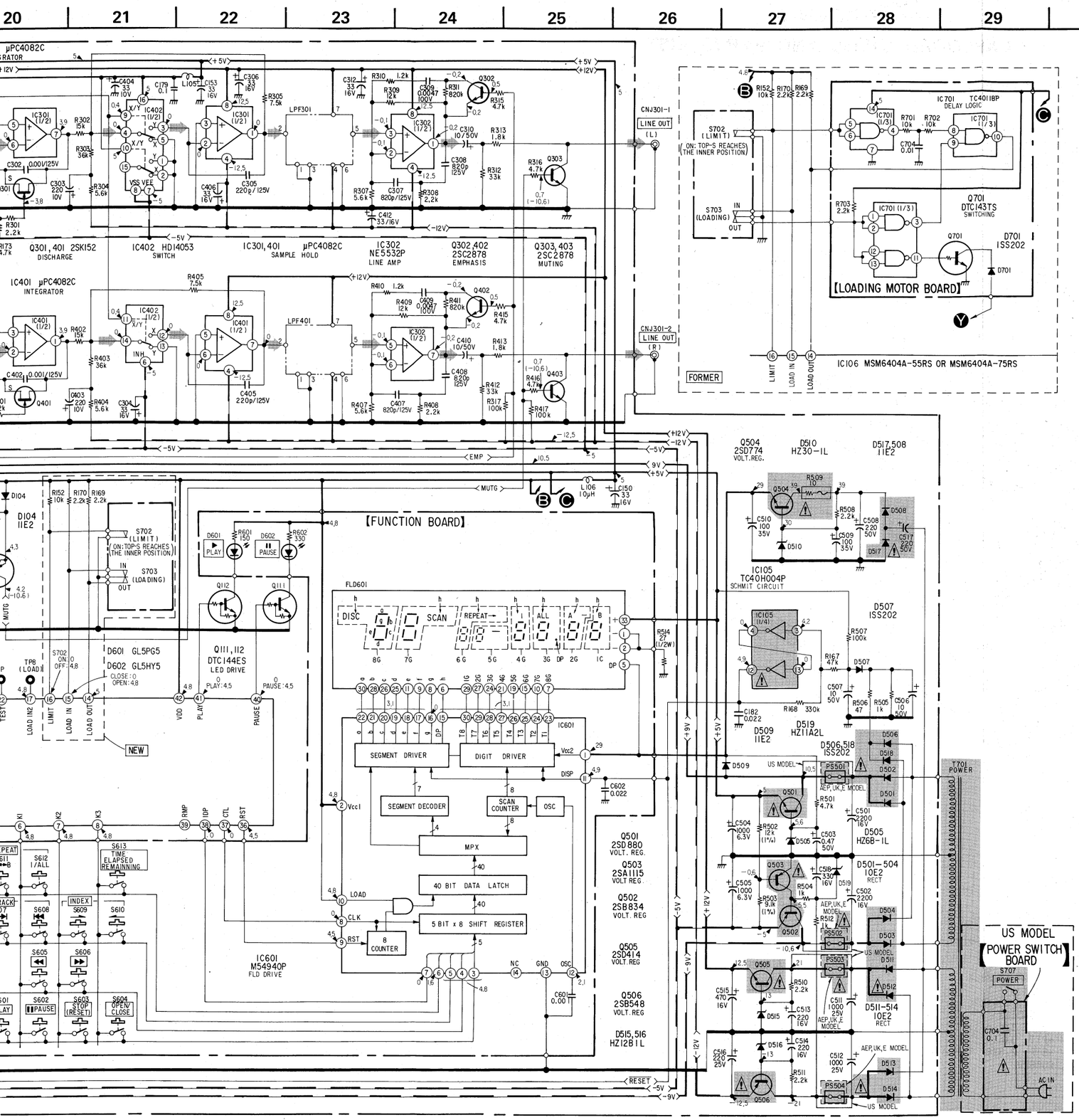
S601 PLAY S602 PAUSE S603 STOP (RESET) S604 A⇔B S605 S606 S607 TRACK S608 S609 INDEX S610

Q · IC	D
506	513,514
403	516
303	
505	
302	511,512
	515
402	
IC302	
502	
503	503,504
	519
	518
	501,502
	506 505
501	509
	507
	510
	517
	508
504 IC402	
IC401 IC301	201
401	
IC201 IC104	
202 301	
201	
IC109	102
120	
IC101	
IC107	105
117,118	101
115,116 IC108	
102	
101	
IC102 902	
104	
103 113 IC105	
901 114	
106	104
105 112 IC106	
IC103 111	
108,107,110,119	

4-2. SCHEMATIC DIAGRAM




IC107 CX23035
DIGITAL SIGNAL PROCESSOR/CLV SERVO
PHASE COMPARATOR
SUB-CODE SYNC DET
SUB-CODE DECODER
CRC CHECK
LATCH
EDGE DET
23 BIT SHIFT REGISTER
EFM DECODER
INTERPOLATION
PARALLEL/SERIAL CONVERTER
FRAME SYNC DET, PROTECTION AND INTERPOLATION
TIMING GENERATOR FROM VCO
ERROR DET, ERROR CORRECTION
TIMING GENERATOR FROM X'TAL
RAM ADDRESS GENERATOR
CPU INTERFACE
CLV CONTROL
SPEED SERVO
PHASE SERVO
HIGH SPEED ACCESS SERVO
TRACKING COUNTER
IC108 MB 8416-20LPF
16k BIT RAM
IC109 CX20017
D/A CONVERTER
TTL-ECL INTERFACE CIRCUIT
HIGHER ORDER 8BIT SHIFT REGISTER LATCHES COUNTER
LOWER ORDER 8BIT SHIFT REGISTER LATCHES COUNTER
ANALOG SWITCH DRIVE CIRCUIT
DISCHARGE DRIVE CIRCUIT(L)
DISCHARGE DRIVE CIRCUIT(R)
256:1 CONSTANT CURRENT SOURCE
TIMING GENERATOR
CLOCK BUFFER
IC301 μPC4082C
INTEGRATOR
Q301, 401 2SK152
DISCHARGE
IC402 HD14053
SWITCH
IC301, 401 μPC4082C
SAMPLE HOLD
IC302 NE5532P
LINE AMP
Q302, 402 2SC2878
EMPHASIS
Q303, 403 2SC2878
MUTING
IC401 μPC4082C
INTEGRATOR
LPF301
LPF401
CNJ301-1 LINE OUT (L)
CNJ301-2 LINE OUT (R)
FORMER
S702 (LIMIT) (ON: TOP-S REACHES (THE INNER POSITION)
S703 (IN (LOADING) OUT
IC104 TL082CP
LOWPASS FILTER
DECODER
2048x8(16384) RAM CELL
SELECTOR
IC201 μPC4558D
APC
IC105 TC40H004P
INVERTER
Q113 DTA144E
EMPHASIS DRIVE
Q114 DTA144ES
MUTING DRIVE
D104 1IE2
【FUNCTION BOARD】
D601 PLAY
D602 PAUSE
Q111, 112 DTC144ES
LED DRIVE
FLD601
IC601 M54940P
FLD DRIVE
SEGMENT DRIVER
DIGIT DRIVER
SEGMENT DECODER
SCAN COUNTER
OSC
MPX
40 BIT DATA LATCH
5 BIT x 8 SHIFT REGISTER
8 COUNTER
REPEAT A⇄B
1/ALL
TIME ELAPSED REMAINING
TRACK
INDEX
PLAY
PAUSE
STOP (RESET)
OPEN/CLOSE
Q101 2SD774 Q102 2SB734
MOTOR DRIVE (FOCUS)
IC103 NJM4558D
SPINDLE DRIVE
Q109 2SD774 Q110 2SB734
MOTOR DRIVE (SPINDLE)
【SPINDLE MOTOR BOARD】
FOCUS COIL
M703 (SPINDLE)
KSS121A
OPTICAL PICKUP BLOCK(1/2)
Q104 2SB734
DRIVE (SLED)
Q105 2SD774 Q106 2SB734
MOTOR DRIVE (TRACKING)
Q107 2SD774 Q108 2SB734
MOTOR DRIVE (LOADING)
IC103 NJM4558D
LODING DRIVE
【SLED MOTOR BOARD】
M701 (SLED)
TRACKING COIL
【LOADING MOTOR BOARD】
M702 (LOADING)
IC106 MSM6404A 55RS(FORMER) MSM6404A-75RS(FORMER) MSM6404A-82RS(NEW)
SYSTEM CONTROL
LOAD IN
LOAD OUT
NEW
Q501 2SD880 VOLT. REG.
Q503 2SA1115 VOLT. REG.
Q502 2SB834 VOLT. REG
Q505 2SD414 VOLT. REG
Q506 2SB548 VOLT. REG
D515, 516 HZ12B1L



Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and 1/4 W or less unless otherwise
- ▨▷ : signal path.
- Components for right channel have same values as for left channel. Reference numbers are coded from 200.
- △ : internal component.
- 1% shows tolerance.
- ▬▬ : B+ bus.
- ▬ ▬ : B− bus.
- ▭ : adjustment for repair.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (50 kΩ/V).
  no mark: STOP
  ( ): PLAY
- Waveforms are taken to ground in Adjustment mode by using oscilloscope.
  Voltage variations may be noted due to normal production tolerances.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

CDP-30

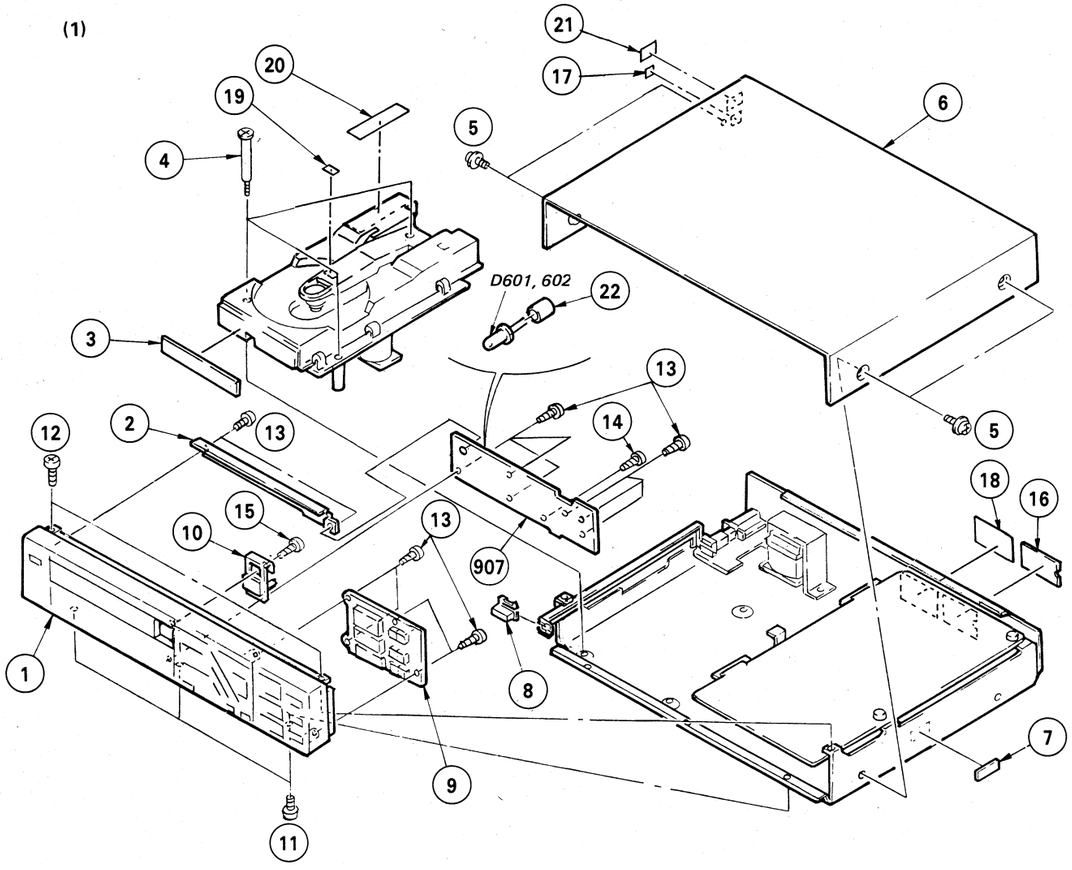
CDP-30

SECTION 5
EXPLODED VIEWS AND PARTS LIST

NOTE:
- The mechanical parts with no reference number in the exploded views are not supplied.
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The construction parts of an assembled part are indicated with a collation number in the remark column.

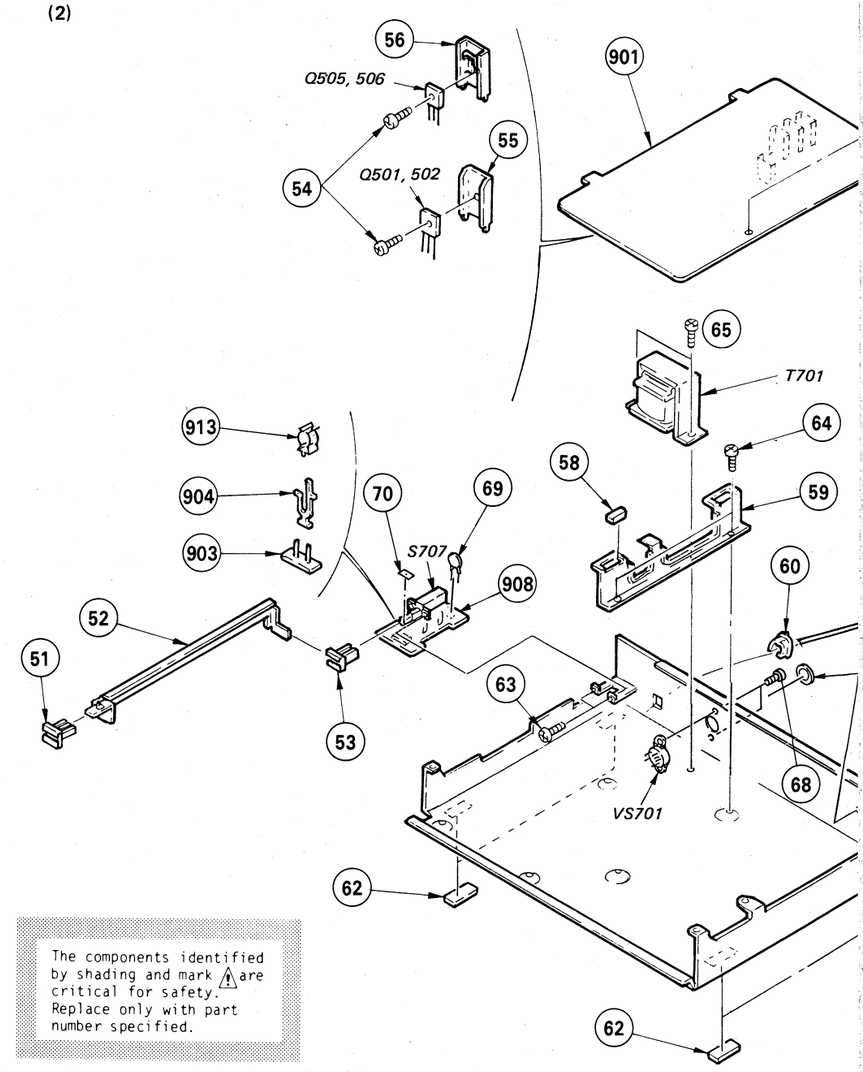
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

(1)



No.	Part No.	Description	Remarks
1	X-4910-413-1	PANEL ASSY, FRONT	
2	*4-910-459-01	REINFORCEMENT, PANEL	
3	X-4910-402-1	PANEL ASSY, LOADING	
4	4-910-416-01	SCREW, FITTING, LOADING CHASSIS	
5	4-886-821-01	SCREW, M3 CASE	
6	4-910-445-01	CASE	
7	*3-701-030-00	LABEL, SERIAL NUMBER	
8	4-907-611-01	KNOB, POWER	
9	X-4910-403-1	BUTTON ASSY, CONTROL	
10	4-910-410-01	BUTTON, LOADING	
11	7-685-871-01	SCREW +BVTT 3X6 (S)	
12	7-685-751-09	SCREW +PTT 3X6 (S)	
13	7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S	
14	*3-886-569-00	TUBE, RUBBER	
15	7-685-146-19	SCREW +BTP 3X8 TYPE2 N-S	
16	*4-910-464-01	(AEP).....LABEL, MODEL NUMBER	
	*4-910-465-01	(G-AEP)...LABEL, MODEL NUMBER	
	*4-910-466-01	(E).....LABEL, MODEL NUMBER	
	*4-910-467-01	(US).....LABEL, MODEL NUMBER	
	*4-910-468-01	(UK).....LABEL, MODEL NUMBER	
17	*3-323-294-01	(US)...LABEL, DHHS INTEROCK	
	3-703-079-21	(UK)...LABEL, CAUTION (BACK)	
18	*4-885-838-00	(AEP,G-AEP,UK,E)...LABEL, CLASS 1	
19	4-908-404-01	(AEP,G-AEP,UK,E)...LABEL, APARTURE, LASER, DHHS	
20	*4-885-843-02	(AEP,G-AEP,UK,E)...LABEL, CAUTION, LASER	
21	3-703-680-00	(US)....LABEL, SUB CAUTION, NEW UL	
22	7-685-538-14	SCREW +BTP 2.6X16 TYPE2 N-S	
907	*1-615-438-11	PC BOARD, FUNCTION	

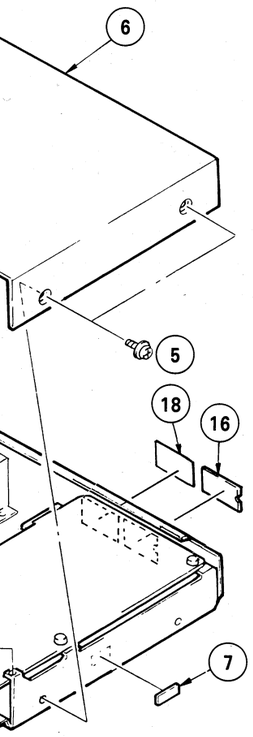
(2)



The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

No.	Part No.	Description	Remarks
51	4-908-569-01	JOINT, SWITCH, POWER	
52	*4-910-440-01	LEVER, POWER SELECTION	
53	4-866-342-00	JOINT (B), KNOB	
54	2-259-121-00	SCREW, TR	
55	*4-886-555-00	HEAT SINK	
56	*3-312-615-11	HEAT SINK	
57	*4-910-469-01	PLATE, GROUND	
58	9-911-843-XX	CUSHION	
59	*4-910-460-01	HOLDER, PC BOARD	
60	3-703-244-00	(AEP,G-AEP,UK)...BUSHING (2104), CORD	
	3-703-571-11	(US,E).....BUSHING (S)(4516), CORD	
61	*4-910-450-01	(US,AEP,G-AEP,UK,E)...CHASSIS, MAIN	
	*4-910-450-11	(E).....CHASSIS, MAIN	
62	*4-886-430-01	FELT, FOOT	
63	7-682-647-01	SCREW +PS 3X6	
64	7-685-871-01	SCREW +BVTT 3X6 (S)	
65	7-685-880-01	SCREW +BVTT 4X6 (S)	
66	7-685-646-29	SCREW +BVTP 3	
67	*4-910-474-01	(E)....LABEL,	
68	7-682-546-09	SCREW +B 3X5	
69	4-875-455-01	(AEP,G-AEP,UK,	
70	3-701-948-13	(AEP,G-AEP,UK)	
	3-701-986-17	(E).....	
901	*A-4651-038-A	(US).....MOUN	
	*A-4651-040-A	(AEP,G-AEP,UK,	
903	*1-535-139-00	BASE POST 19MM	
904	1-535-416-00	TERMINAL	
905	⚠ 1-534-817-XX	(AEP,UK)...COR	
	⚠ 1-551-472-00	(E2).....COR	
	⚠ 1-551-506-XX	(US).....COR	
	⚠ 1-555-734-00	(E3).....COR	
	⚠ 1-556-562-11	(UK).....COR	
908	*1-615-439-11	PC BOARD, POWE	
913	1-533-183-11	(AEP,G-AEP,UK,	

T



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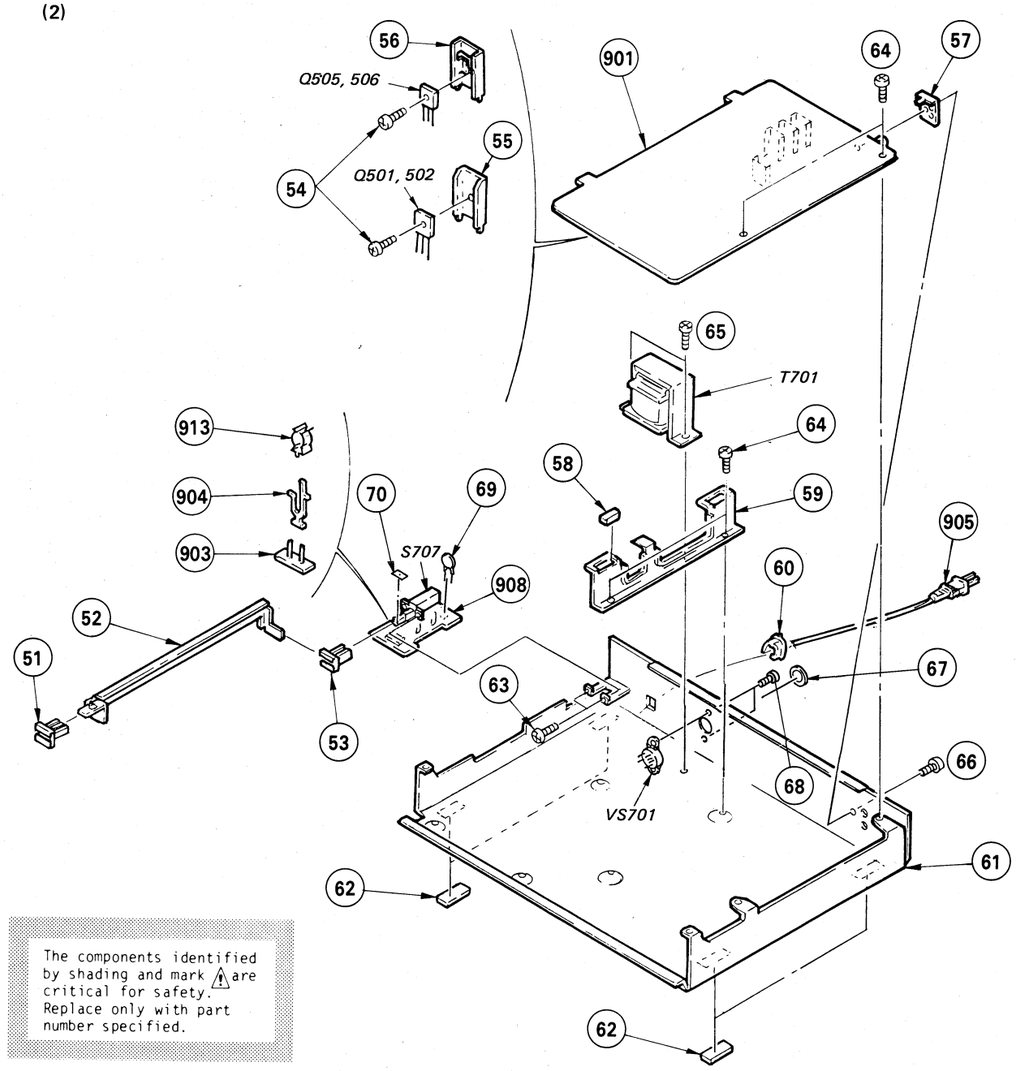
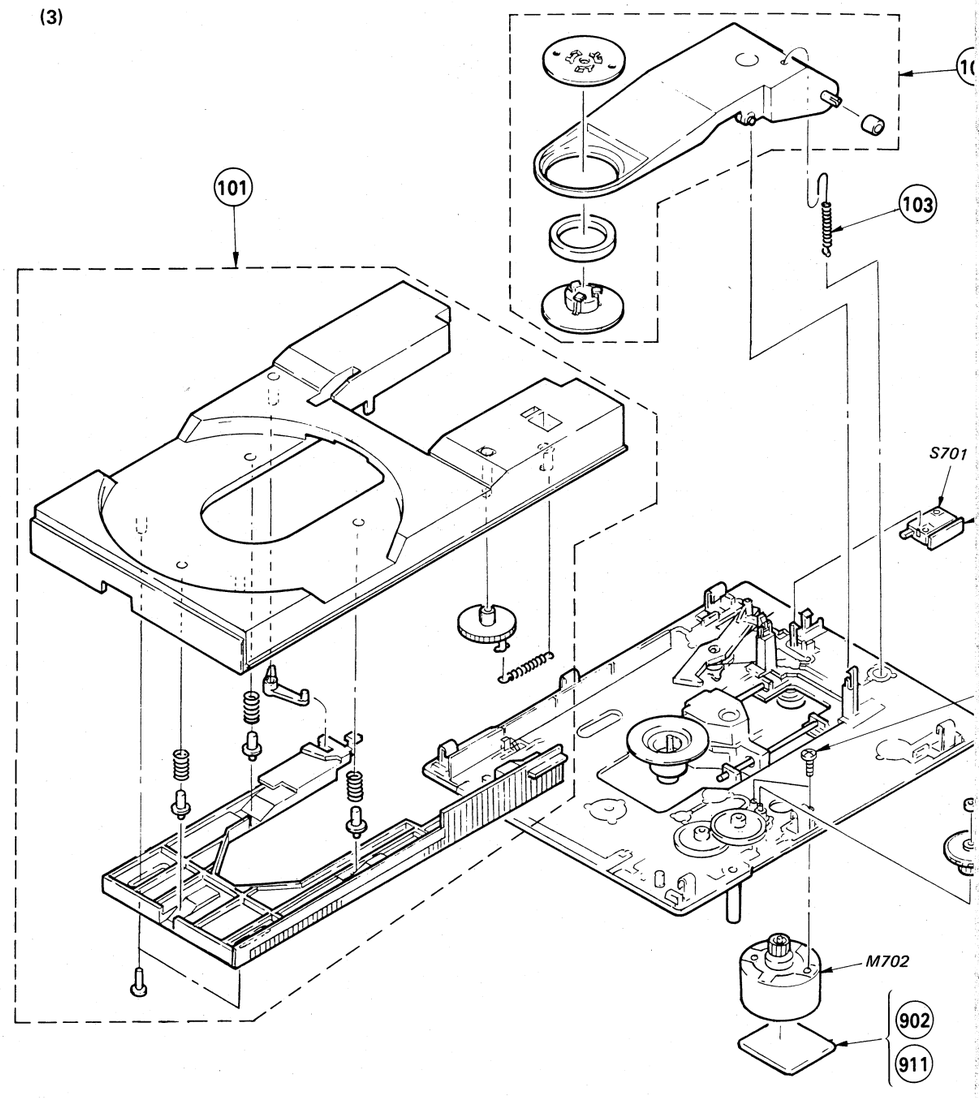


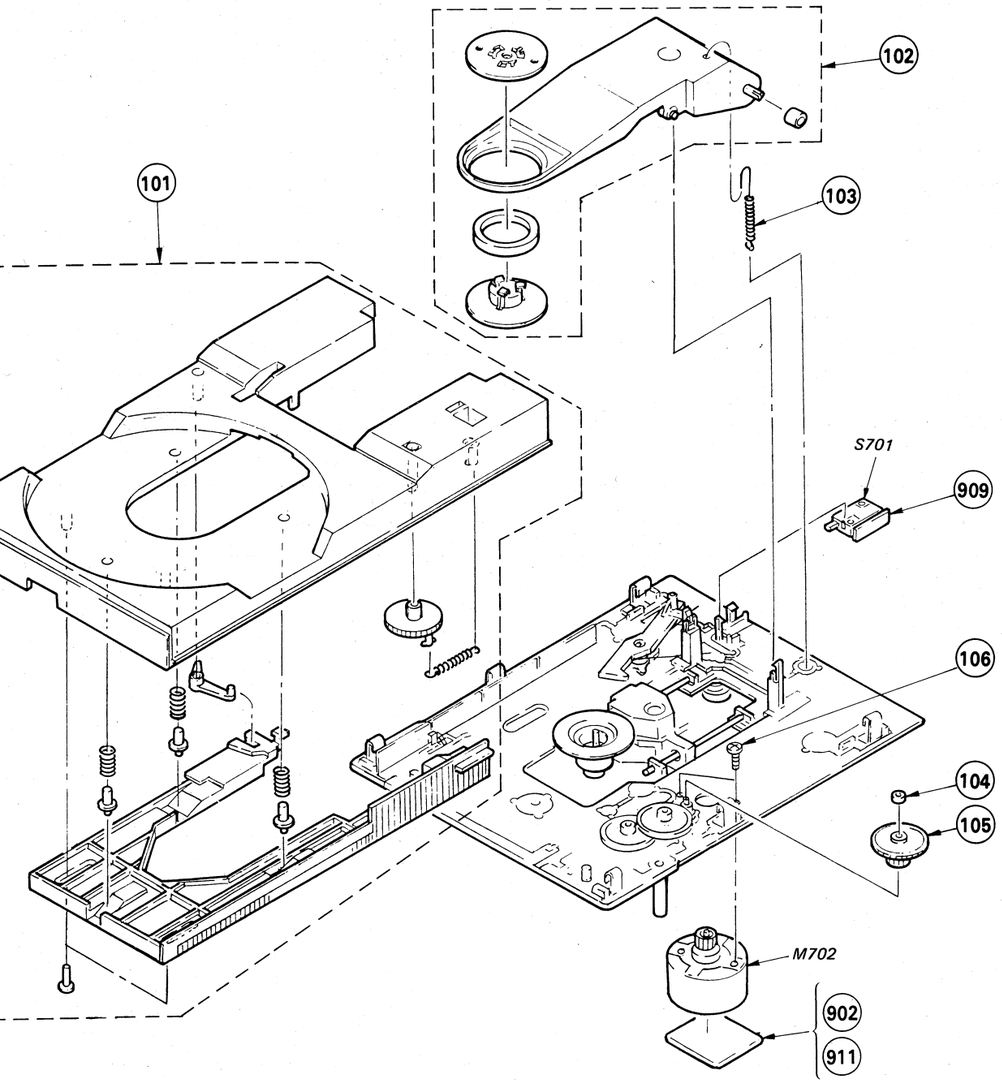
The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

(3)



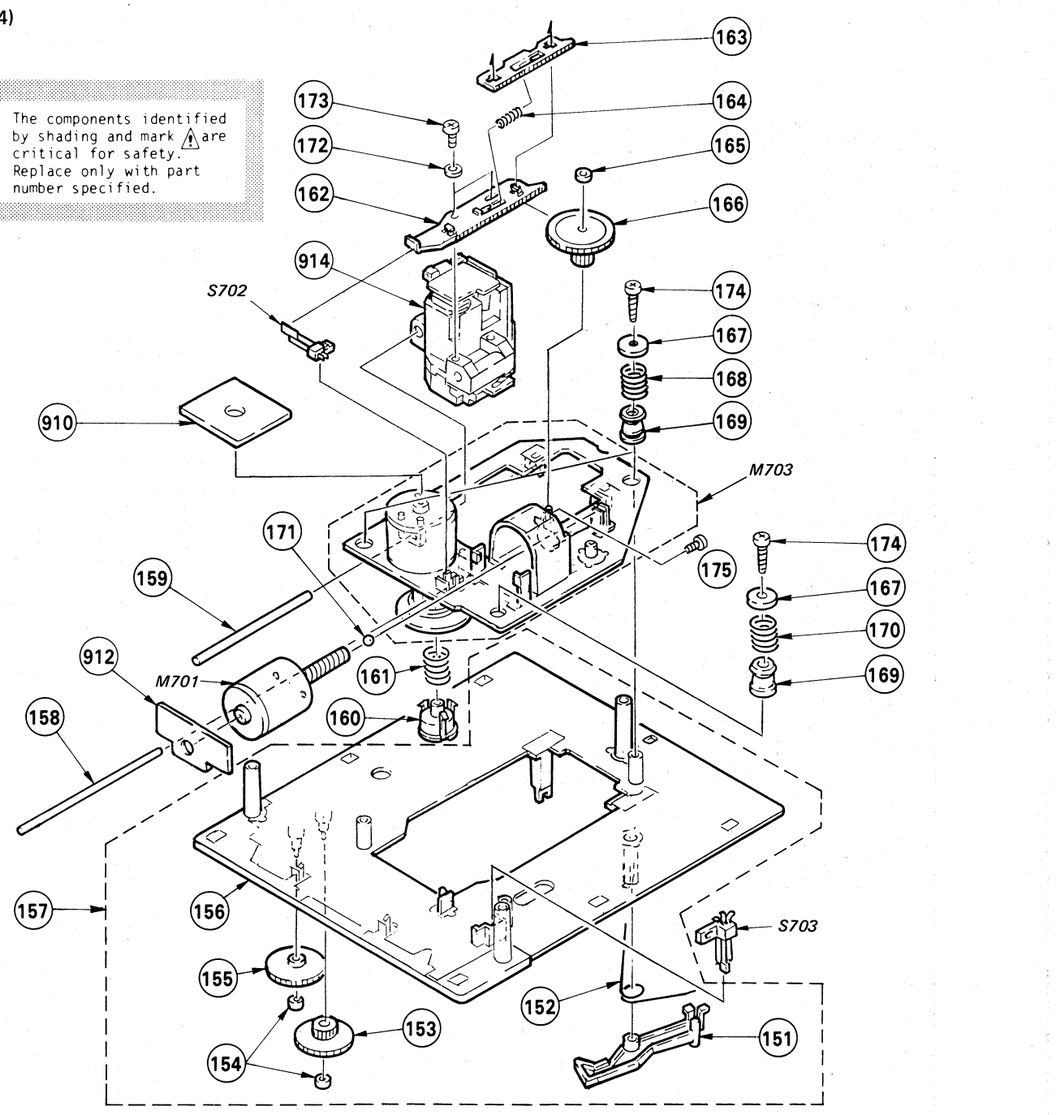
No.	Part No.	Description	Remarks
		tion	Remarks
		BTP 3X8 TYPE2 N-S	
		...LABEL, MODEL NUMBER	
		...LABEL, MODEL NUMBER	
		...LABEL, MODEL NUMBER	
		...LABEL, MODEL NUMBER	
		...LABEL, MODEL NUMBER	
		LABEL, DHHS INTEROCK	
		LABEL, CAUTION (BACK)	
		AEP,UK,E)...LABEL, CLASS 1	
		AEP,UK,E)...LABEL, APARTURE, LASER, DHHS	
		AEP,UK,E)...LABEL, CAUTION, LASER	
		.LABEL, SUB CAUTION, NEW UL	
		BTP 2.6X16 TYPE2 N-S	
		D, FUNCTION	
51	4-908-569-01	JOINT, SWITCH, POWER	
52	*4-910-440-01	LEVER, POWER SELECTION	
53	4-866-342-00	JOINT (B), KNOB	
54	2-259-121-00	SCREW, TR	
55	*4-886-555-00	HEAT SINK	
56	*3-312-615-11	HEAT SINK	
57	*4-910-469-01	PLATE, GROUND	
58	9-911-843-XX	CUSHION	
59	*4-910-460-01	HOLDER, PC BOARD	
60	3-703-244-00	(AEP,G-AEP,UK)...BUSHING (2104), CORD	
	3-703-571-11	(US,E).....BUSHING (S)(4516), CORD	
61	*4-910-450-01	(US,AEP,G-AEP,UK,E)...CHASSIS, MAIN	
	*4-910-450-11	(E).....CHASSIS, MAIN	
62	*4-886-430-01	FELT, FOOT	
63	7-682-647-01	SCREW +PS 3X6	
64	7-685-871-01	SCREW +BVTT 3X6 (S)	
65	7-685-880-01	SCREW +BVTT 4X6 (S)	
66	7-685-646-29	SCREW +BVTP 3X8 TYPE2 SLIT	
67	*4-910-474-01	(E)....LABEL, VOLTAGE SELECTOR	
68	7-682-546-09	SCREW +B 3X5	
69	4-875-455-01	(AEP,G-AEP,UK,E)..COVER(DIA.20), CAPACITOR	
70	3-701-948-13	(AEP,G-AEP,UK)...LABEL FUSE	
	3-701-986-17	(E).....LABEL FUSE	
901	*A-4651-038-A	(US).....MOUNTED PCB, MAIN	
	*A-4651-040-A	(AEP,G-AEP,UK,E)...MOUNTED PCB, MAIN	
903	*1-535-139-00	BASE POST 19MM (10MM PITCH) 2P	
904	1-535-416-00	TERMINAL	
905	⚠.1-534-817-XX	(AEP,UK)...CORD, POWER, EULO PLUG	
	⚠.1-551-472-00	(E2).....CORD, POWER	
	⚠.1-551-506-XX	(US).....CORD, POWER	
	⚠.1-555-734-00	(E3).....CORD, POWER	
	⚠.1-556-562-11	(UK).....CORD, POWER	
908	*1-615-439-11	PC BOARD, POWER SWITCH	
913	1-533-183-11	(AEP,G-AEP,UK,E)...HOLDER, FUSE	

No.	Part No.	Description	Remarks
101	X-4910-410-1	TABEL ASSY, DISK	
102	A-4604-149-A	ARM ASSY, CHUCKING	
103	4-910-428-01	SPRING, TENSION (CHUCKING)	
104	4-910-418-01	BUSHING (DIA. 4)	
105	4-910-454-01	GEAR (1), LOADING	
106	7-621-770-67	SCREW +B 2.6X6	
909	*1-615-504-11	PC BOARD, LD SWITCH	
911	*1-615-506-11	(NEW).....PC BOARD, LO MOT	
	*1-615-957-11	(FORMER)...PC BOARD, LOADIN	



(4)

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.



Part No.	Description	Remarks
X-4910-410-1	TABEL ASSY, DISK	
A-4604-149-A	ARM ASSY, CHUCKING	
4-910-428-01	SPRING, TENSION (CHUCKING)	
4-910-418-01	BUSHING (DIA. 4)	
4-910-454-01	GEAR (1), LOADING	

No.	Part No.	Description	Remarks
106	7-621-770-67	SCREW +B 2.6X6	
909	*1-615-504-11	PC BOARD, LD SWITCH	
911	*1-615-506-11	(NEW).....PC BOARD, LO MOTOR	
	*1-615-957-11	(FORMER)...PC BOARD, LOADING MOTOR	

No.	Part No.	Description	Remarks
151	*4-910-434-01	LEVER, LOCK	
152	4-910-412-01	SPRING	
153	4-910-402-01	GEAR (2), LOADING	
154	4-910-418-01	BUSHING (DIA. 4)	
155	4-910-403-01	GEAR (3), LOADING	
156	4-910-448-01	CHASSIS (OUTSERT), LOADING	
157	*X-4910-405-1	CHASSIS ASSY, LOADING	151,156
158	*4-910-431-01	SHAFT, SLIDE	
159	*4-910-431-11	SHAFT, SLIDE	
160	4-910-437-01	CAP, CENTERING	
161	4-910-427-01	SPRING, COMPRESSION	
162	4-910-425-01	RACK (A)	
163	4-910-442-01	RACK (B)	
164	4-910-462-01	SPRING, COMPRESSION (RACK)	
165	4-910-418-01	BUSHING (DIA. 4)	

No.	Part No.	Description	Remarks
164	4-910-462-01	SPRING, COMPRESSION (RACK)	
165	4-910-418-01	BUSHING (DIA. 4)	
166	4-910-432-01	GEAR, SLED	
167	4-910-414-01	RETAINER, SPRING	
168	4-910-423-01	SPRING (FLOATING A),COMPRESSION	
169	4-910-413-01	RUBBER, FLOATING	
170	4-910-463-01	SPRING, COMPRESSION (FLOATING B)	
171	7-671-112-11	BALL, STEEL	
172	7-688-002-01	W 2.6, SMALL	
173	7-621-775-20	SCREW +P 2.6X5	
174	7-682-535-19	+BTP 2.6X10	
175	7-621-775-15	SCREW +B 2.6X4	
902	*A-4653-028-A	MOUNTED PCB, LOADING MOTOR	
910	*1-615-505-11	PC BOARD, SP MOTOR	
912	*1-615-507-11	PC BOARD, SL MOTOR	
914	⚠ X-4910-424-1	DEVICE, OPTICS (KSS-121A)	

SECTION 6
ELECTRICAL PARTS LIST

NOTE:
- Items marked " ★ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuitsin a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms.
- F : nonflammable

COILS
- MMH : mH, UH : μH

SEMICONDUCTORS
In each case, U : μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description
901	*A-4651-038-A	(US).....MOUNTED PCB, MAIN
	*A-4651-040-A	(AEP,G-AEP,UK,E)...MOUNTED PCB, MAIN
902	*A-4653-028-A	MOUNTED PCB, LOADING MOTOR
903	*1-535-139-00	BASE POST 19MM (10MM PITCH) 2P
904	1-535-416-00	TERMINAL
905	⚠1-534-817-XX	(AEP,UK)...CORD, POWER, EULO PLUG
	⚠1-551-472-00	(E2).....CORD, POWER
	⚠1-551-506-XX	(US).....CORD, POWER
	⚠1-555-734-00	(E3).....CORD, POWER
	⚠1-556-562-11	(UK).....CORD, POWER
906	*1-564-520-11	PLUG, CONNECTOR 5P
907	*1-615-438-11	PC BOARD, FUNCTION
908	*1-615-439-11	PC BOARD, POWER SWITCH
909	*1-615-504-11	PC BOARD, LD SWITCH
910	*1-615-505-11	PC BOARD, SP MOTOR
911	*1-615-506-11	(NEW).....PC BOARD, LO MOTOR
	*1-615-957-11	(FORMER)...PC BOARD, LOADING MOTOR
912	*1-615-507-11	PC BOARD, SL MOTOR
913	1-533-183-11	(AEP,G-AEP,UK,E)...HOLDER, FUSE
914	⚠X-4910-424-1	DEVICE, OPTICS (KSS-121A)

Ref.No.	Part No.	Description			
C101	1-123-318-00	ELECT	33MF	20%	16V
C103	1-130-479-00	MYLAR	0.0047MF	5%	50V
C104	1-162-205-31	CERAMIC	18PF	5%	50V
C105	1-162-205-31	CERAMIC	18PF	5%	50V
C106	1-123-306-00	ELECT	47MF	20%	10V
C107	1-123-379-00	ELECT	0.47MF	20%	50V
C108	1-162-306-31	CERAMIC	0.01MF	20%	16V
C109	1-130-489-00	MYLAR	0.033MF	5%	50V
C110	1-162-282-31	CERAMIC	100PF	10%	50V
C111	1-162-282-31	CERAMIC	100PF	10%	50V
C112	1-123-306-00	ELECT	47MF	20%	10V
C113	1-162-302-31	CERAMIC	0.0022MF	20%	16V
C114	1-162-302-31	CERAMIC	0.0022MF	20%	16V
C115	1-136-165-00	FILM	0.1MF	5%	50V
C116	1-162-290-31	CERAMIC	470PF	10%	50V
C117	1-162-302-31	CERAMIC	0.0022MF	20%	16V
C118	1-130-489-00	MYLAR	0.033MF	5%	50V
C119	1-124-184-00	ELECT	3.3MF	20%	50V
C120	1-136-169-00	FILM	0.22MF	5%	50V
C121	1-162-302-31	CERAMIC	0.0022MF	20%	16V
C122	1-130-475-00	MYLAR	0.0022MF	5%	50V
C123	1-130-487-00	MYLAR	0.022MF	5%	50V
C124	1-162-291-31	CERAMIC	560PF	10%	50V
C125	1-136-161-00	FILM	0.047MF	5%	50V
C126	1-136-169-00	FILM	0.22MF	5%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C127	1-130-489-00	MYLAR	0.033MF	5%	50V
C128	1-123-307-00	ELECT	100MF	20%	10V
C129	1-123-307-00	ELECT	100MF	20%	10V
C130	1-131-372-00	TANTALUM	15MF	10%	16V
C131	1-123-333-00	ELECT	100MF	20%	16V
C132	1-123-333-00	ELECT	100MF	20%	16V
C133	1-162-294-31	CERAMIC	0.001MF	10%	50V
C134	1-162-294-31	CERAMIC	0.001MF	10%	50V
C135	1-123-356-00	ELECT	10MF	20%	50V
C136	1-162-290-31	CERAMIC	470PF	10%	50V
C137	1-130-481-00	MYLAR	0.0068MF	5%	50V
C138	1-136-165-00	FILM	0.1MF	5%	50V
C140	1-123-380-00	ELECT	1MF	20%	50V
C141	1-102-848-00	CERAMIC	180PF	5%	50V
C142	1-102-647-00	CERAMIC	39PF	5%	50V
C143	1-102-753-00	CERAMIC	36PF	5%	50V
C144	1-162-302-31	CERAMIC	0.0022MF	20%	16V
C145	1-162-302-31	CERAMIC	0.0022MF	20%	16V
C146	1-130-483-00	MYLAR	0.01MF	5%	50V
C147	1-162-209-31	CERAMIC	27PF	5%	50V
C148	1-162-209-31	CERAMIC	27PF	5%	50V
C149	1-123-318-00	ELECT	33MF	20%	16V
C150	1-123-318-00	ELECT	33MF	20%	16V
C151	1-162-213-31	CERAMIC	39PF	5%	50V
C152	1-162-213-31	CERAMIC	39PF	5%	50V
C153	1-123-318-00	ELECT	33MF	20%	16V
C154	1-123-318-00	ELECT	33MF	20%	16V
C155	1-162-215-31	CERAMIC	47PF	5%	50V
C156	1-162-294-31	CERAMIC	0.001MF	10%	50V
C157	1-162-215-31	CERAMIC	47PF	5%	50V
C158	1-123-318-00	ELECT	33MF	20%	16V
C159	1-102-513-00	CERAMIC	18PF	5%	50V
C160	1-123-318-00	ELECT	33MF	20%	16V
C161	1-123-318-00	ELECT	33MF	20%	16V
C164	1-136-161-00	FILM	0.047MF	5%	50V
C165	1-136-169-00	FILM	0.22MF	5%	50V
C166	1-162-294-31	CERAMIC	0.001MF	10%	50V
C167	1-162-294-31	CERAMIC	0.001MF	10%	50V
C168	1-136-169-00	FILM	0.22MF	5%	50V
C169	1-123-356-00	ELECT	10MF	20%	50V
C170	1-123-369-00	ELECT	4.7MF	20%	25V
C171	1-123-298-00	ELECT	470MF	20%	6.3V
C172	1-124-183-00	ELECT	2.2MF	20%	50V
C173	1-162-291-31	CERAMIC	560PF	10%	50V
C174	1-123-318-00	ELECT	33MF	20%	16V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C175	1-136-165-00	FILM	0.1MF	5%	50V
C178	1-101-005-00	CERAMIC	0.022MF		50V
C179	1-161-974-00	CERAMIC	0.1MF	20%	16V
C180	1-161-974-00	CERAMIC	0.1MF	20%	16V
C181	1-161-494-00	CERAMIC	0.022MF	30%	25V
C182	1-101-005-00	CERAMIC	0.022MF		50V
C201	1-123-307-00	ELECT	100MF	20%	10V
C202	1-123-307-00	ELECT	100MF	20%	10V
C302	1-104-240-00	POLYSTYRENE	0.001MF	5%	125V
C303	1-123-308-00	ELECT	220MF	20%	10V
C304	1-123-318-00	ELECT	33MF	20%	16V
C305	1-104-233-00	POLYSTYRENE	220PF	5%	125V
C306	1-123-318-00	ELECT	33MF	20%	16V
C307	1-104-235-00	POLYSTYRENE	820PF	5%	125V
C308	1-104-235-00	POLYSTYRENE	820PF	5%	125V
C309	1-130-289-00	FILM	0.0047MF	5%	100V
C310	1-123-384-00	ELECT	10MF	20%	50V
C312	1-123-318-00	ELECT	33MF	20%	16V
C402	1-104-240-00	POLYSTYRENE	0.001MF	5%	125V
C403	1-123-308-00	ELECT	220MF	20%	10V
C404	1-123-318-00	ELECT	33MF	20%	16V
C405	1-104-233-00	POLYSTYRENE	220PF	5%	125V
C406	1-123-318-00	ELECT	33MF	20%	16V
C407	1-104-235-00	POLYSTYRENE	820PF	5%	125V
C408	1-104-235-00	POLYSTYRENE	820PF	5%	125V
C409	1-130-289-00	FILM	0.0047MF	5%	100V
C410	1-123-384-00	ELECT	10MF	20%	50V
C412	1-123-318-00	ELECT	33MF	20%	16V
C501	1-123-325-00	ELECT	2200MF	20%	16V
C502	1-123-325-00	ELECT	2200MF	20%	16V
C503	1-123-379-00	ELECT	0.47MF	20%	50V
C504	1-123-299-00	ELECT	1000MF	20%	6.3V
C505	1-123-299-00	ELECT	1000MF	20%	6.3V
C506	1-123-356-00	ELECT	10MF	20%	50V
C507	1-123-356-00	ELECT	10MF	20%	50V
C508	1-123-361-00	ELECT	220MF	20%	50V
C509	1-123-345-00	ELECT	100MF	20%	35V
C510	1-123-345-00	ELECT	100MF	20%	35V
C511	1-123-337-00	ELECT	1000MF	20%	25V
C512	1-123-337-00	ELECT	1000MF	20%	25V
C513	1-123-321-00	ELECT	220MF	20%	16V
C514	1-123-321-00	ELECT	220MF	20%	16V
C515	1-123-323-00	ELECT	470MF	20%	16V
C516	1-123-334-00	ELECT	220MF	20%	25V
C517	1-123-361-00	ELECT	220MF	20%	50V
C518	1-123-333-00	ELECT	100MF	20%	16V
C601	1-162-294-31	CERAMIC	0.001MF	10%	50V
C602	1-161-494-00	CERAMIC	0.022MF	30%	25V
C701	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C702	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C703	1-102-121-00	CERAMIC	0.0022MF	10%	50V
C704/A	1-130-483-00	(FORMER)....MYLAR	0.01MF	5%	50V
C704 ⚠	1-161-744-00	CERAMIC	0.01MF		400V
CNJ301	1-562-830-11	JACK, PIN 2P (LINE OUT)			

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description
CP101	*1-564-511-41	PLUG, CONNECTOR 8P
CP102	*1-564-507-41	PLUG, CONNECTOR 4P
CP103	*1-564-509-11	PLUG, CONNECTOR 6P
CP104	*1-564-508-11	PLUG, CONNECTOR 5P
CP105	*1-564-342-11	PIN, CONNECTOR 8P
CP106	*1-564-342-11	PIN, CONNECTOR 8P
CP107	*1-560-064-00	PIN, CONNECTOR 6P
CP108	*1-564-507-11	PLUG, CONNECTOR 4P
CP201	*1-564-507-21	PLUG, CONNECTOR 4P
CP202	*1-564-505-11	PLUG, CONNECTOR 2P
CP501	*1-564-338-00	PIN, CONNECTOR 4P
CP502	*8-719-951-13	TERMINAL
D101	8-719-951-13	DIODE HZ5CLL
D102	8-719-902-79	DIODE KV1236Z
D104	8-719-200-23	DIODE 11E2
D105	8-719-107-94	DIODE 1SS202-1
D201	8-719-107-94	DIODE 1SS202-1
D501 ⚠	8-719-200-02	DIODE 10E-2
D502 ⚠	8-719-200-02	DIODE 10E-2
D503 ⚠	8-719-200-02	DIODE 10E-2
D504 ⚠	8-719-200-02	DIODE 10E-2
D505	8-719-910-64	DIODE HZ6B1L
D506 ⚠	8-719-107-94	DIODE 1SS202-1
D507	8-719-107-94	DIODE 1SS202-1
D508 ⚠	8-719-200-23	DIODE 11E2
D509	8-719-200-23	DIODE 11E2
D510	8-719-913-02	DIODE HZ30-2
D511 ⚠	8-719-200-02	DIODE 10E-2
D512 ⚠	8-719-200-02	DIODE 10E-2
D513 ⚠	8-719-200-02	DIODE 10E-2
D514 ⚠	8-719-200-02	DIODE 10E-2
D515	8-719-910-24	DIODE HZ12B1L
D516	8-719-910-24	DIODE HZ12B1L
D517 ⚠	8-719-200-23	DIODE 11E2
D518 ⚠	8-719-107-94	DIODE 1SS202-1
D519	8-719-910-12	DIODE HZ11A2L
D601	8-719-900-65	DIODE GL-5PG5
D602	8-719-900-57	DIODE GL-5HY5
D701	8-719-107-94	(FORMER)...DIODE 1SS202-1
F701 ⚠	1-532-215-11	(AEP,G-AEP,UK)...FUSE, TIME-LAG 0.800A
F701 ⚠	1-532-285-11	(E)...FUSE, TIME-LAG 1.250A
FLD601	1-519-349-11	INDICATOR TUBE, FLUORESCENT
IC101	8-750-010-90	IC CX20109
IC102	8-750-010-80	IC CX20108
IC103	8-759-145-58	IC UPC4558C
IC104	8-759-990-82	IC TL082CP
IC105 ⚠	8-759-220-04	IC TC40H004P
IC106	8-759-911-76	(FORMER)...IC MSM6404A-55RS
IC106	8-759-920-17	(FORMER)...IC MSM6404A-75RS
IC106		(NEW).....IC MSM6404A-82RS
IC107	8-750-912-52	IC CX23035
IC108	8-759-913-72	IC MB8416-20LPF
IC109	8-752-001-70	IC CX20017
IC201	8-759-145-58	IC UPC4558C
IC301	8-759-990-82	IC TL082CP
IC302	8-759-900-72	IC NE5532P

ELECTRICAL PARTS

Ref.No.	Part No.	Description
IC401	8-759-990-82	IC TL082CP
IC402	8-759-340-53	IC HD14053BP
IC601	8-759-600-35	IC M54940P
IC701	8-759-240-11	(FORMER)...IC TC4011BP
L101	1-408-117-00	MICRO INDUCTOR 10UH
L102	1-408-117-00	MICRO INDUCTOR 10UH
L103	1-426-212-11	COIL (RF)
L104	1-408-551-00	MICRO INDUCTOR 1UH
L105	1-408-563-00	MICRO INDUCTOR 10UH
L106	1-408-563-00	MICRO INDUCTOR 10UH
L201	1-408-117-00	MICRO INDUCTOR 10UH
LPF301	1-464-273-00	FILTER UNIT, LOW PASS
LPF301	1-464-273-21	FILTER UNIT, LOW PASS
LPF401	1-464-273-00	FILTER UNIT, LOW PASS
LPF401	1-464-273-21	FILTER UNIT, LOW PASS
M701	A-4608-308-A	MOTOR ASSY, THREAD
M702	A-4608-307-A	MOTOR ASSY, LOADING
M703	X-4910-411-1	MOTOR ASSY, SPINDLE
PS501⚠	1-532-675-11	(AEP,G-AEP,UK,E)...IC LINK
PS502⚠	1-532-675-11	(AEP,G-AEP,UK,E)...IC LINK
PS503⚠	1-532-685-11	(AEP,G-AEP,UK,E)...IC LINK
PS504⚠	1-532-685-11	(AEP,G-AEP,UK,E)...IC LINK
Q101	8-729-177-43	TRANSISTOR 2SD774
Q102	8-729-103-43	TRANSISTOR 2SB734
Q103	8-729-177-43	TRANSISTOR 2SD774
Q104	8-729-103-43	TRANSISTOR 2SB734
Q105	8-729-177-43	TRANSISTOR 2SD774
Q106	8-729-103-43	TRANSISTOR 2SB734
Q107	8-729-177-43	TRANSISTOR 2SD774
Q108	8-729-103-43	TRANSISTOR 2SB734
Q109	8-729-177-43	TRANSISTOR 2SD774
Q110	8-729-103-43	TRANSISTOR 2SB734
Q111	8-729-900-89	TRANSISTOR DTC144ES
Q112	8-729-900-89	TRANSISTOR DTC144ES
Q113	8-729-900-65	TRANSISTOR DTA144ES
Q114	8-729-900-65	TRANSISTOR DTA144ES
Q115	8-729-900-74	TRANSISTOR DTC143TS
Q116	8-729-900-74	TRANSISTOR DTC143TS
Q117	8-729-117-54	TRANSISTOR 2SA1175
Q118	8-729-900-89	TRANSISTOR DTC144ES
Q120	8-729-900-61	TRANSISTOR DTC114ES
Q201	8-729-178-54	TRANSISTOR 2SC2785-E
Q202	8-729-177-43	TRANSISTOR 2SD774
Q301	8-769-163-00	TRANSISTOR 2SK152-3
Q302	8-729-201-04	TRANSISTOR 2SC2878
Q303	8-729-201-04	TRANSISTOR 2SC2878
Q401	8-769-163-00	TRANSISTOR 2SK152-3
Q402	8-729-201-04	TRANSISTOR 2SC2878
Q403	8-729-201-04	TRANSISTOR 2SC2878
Q501⚠	8-729-288-02	TRANSISTOR 2SD880
Q502⚠	8-729-283-42	TRANSISTOR 2SB834
Q503⚠	8-729-117-54	TRANSISTOR 2SA1175
Q504⚠	8-729-177-43	TRANSISTOR 2SD774
Q505⚠	8-729-141-42	TRANSISTOR 2SD414-R
Q506⚠	8-729-154-82	TRANSISTOR 2SB548-R

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
Q701	8-729-900-74	(FORMER)...TRANSISTOR DTC143TS			
Q901	8-729-900-74	(FORMER)...TRANSISTOR DTC143TS			
Q902	8-729-900-63	(FORMER)...TRANSISTOR DTC124ES			
R101	1-247-831-00	CARBON	1K	5%	1/6W
R105	1-247-861-00	CARBON	18K	5%	1/6W
R106	1-247-893-00	CARBON	390K	5%	1/6W
R107	1-247-883-00	CARBON	150K	5%	1/6W
R108	1-247-855-00	CARBON	10K	5%	1/6W
R109	1-247-879-00	CARBON	100K	5%	1/6W
R110	1-247-855-00	CARBON	10K	5%	1/6W
R111	1-247-855-00	CARBON	10K	5%	1/6W
R112	1-247-881-00	CARBON	120K	5%	1/6W
R113	1-247-897-00	CARBON	560K	5%	1/6W
R114	1-247-883-00	CARBON	150K	5%	1/6W
R115	1-247-863-00	CARBON	22K	5%	1/6W
R116	1-247-867-00	CARBON	33K	5%	1/6W
R117	1-247-863-00	CARBON	22K	5%	1/6W
R118	1-247-807-00	CARBON	100	5%	1/6W
R119	1-247-847-00	CARBON	4.7K	5%	1/6W
R120	1-247-819-00	CARBON	330	5%	1/6W
R121	1-247-865-00	CARBON	27K	5%	1/6W
R122	1-247-807-00	CARBON	100	5%	1/6W
R123	1-247-845-00	CARBON	3.9K	5%	1/6W
R124	1-247-873-00	CARBON	56K	5%	1/6W
R125	1-247-855-00	CARBON	10K	5%	1/6W
R126	1-247-807-00	CARBON	100	5%	1/6W
R127	1-247-831-00	CARBON	1K	5%	1/6W
R128	1-247-869-00	CARBON	39K	5%	1/6W
R129	1-247-865-00	CARBON	27K	5%	1/6W
R130	1-247-903-00	CARBON	1M	5%	1/6W
R131	1-247-879-00	CARBON	100K	5%	1/6W
R132	1-247-837-00	CARBON	1.8K	5%	1/6W
R133	1-247-851-00	CARBON	6.8K	5%	1/6W
R134	1-247-831-00	CARBON	1K	5%	1/6W
R135	1-247-859-00	CARBON	15K	5%	1/6W
R136	1-247-855-00	CARBON	10K	5%	1/6W
R137	1-247-871-00	CARBON	47K	5%	1/6W
R138	1-247-864-00	CARBON	24K	5%	1/6W
R139	1-247-851-00	CARBON	6.8K	5%	1/6W
R140	1-247-847-00	CARBON	4.7K	5%	1/6W
R141	1-247-878-00	CARBON	91K	5%	1/6W
R142	1-247-877-00	CARBON	82K	5%	1/6W
R143	1-247-878-00	CARBON	91K	5%	1/6W
R144	1-247-877-00	CARBON	82K	5%	1/6W
R145	1-247-815-00	CARBON	220	5%	1/6W
R146	1-247-887-00	CARBON	220K	5%	1/6W
R147	1-247-869-00	CARBON	39K	5%	1/6W
R148	1-215-449-00	METAL	15K	1%	1/6W
R149	1-215-453-00	METAL	22K	1%	1/6W
R150	1-247-863-00	CARBON	22K	5%	1/6W
R151	1-247-856-00	CARBON	11K	5%	1/6W
R152	1-247-855-00	CARBON	10K	5%	1/6W
R153	1-247-856-00	CARBON	11K	5%	1/6W
R154	1-215-441-00	METAL	6.8K	1%	1/6W

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R155	1-215-441-00	METAL	6.8K	1%	1/6W
R156	1-247-903-00	CARBON	1M	5%	1/6W
R157	1-247-879-00	CARBON	100K	5%	1/6W
R158	1-247-879-00	CARBON	100K	5%	1/6W
R159	1-247-879-00	CARBON	100K	5%	1/6W
R160	1-247-867-00	CARBON	33K	5%	1/6W
R161	1-247-857-00	CARBON	12K	5%	1/6W
R162	1-247-852-00	CARBON	7.5K	5%	1/6W
R163	1-215-453-00	METAL	22K	1%	1/6W
R164	1-215-453-00	METAL	22K	1%	1/6W
R165	1-247-841-00	CARBON	2.7K	5%	1/6W
R166	1-247-847-00	CARBON	4.7K	5%	1/6W
R167	1-247-871-00	CARBON	47K	5%	1/6W
R168	1-247-891-00	CARBON	330K	5%	1/6W
R169	1-249-421-11	CARBON	2.2K	5%	1/6W
R170	1-249-421-11	CARBON	2.2K	5%	1/6W
R171	1-247-807-00	CARBON	100	5%	1/6W
R172	1-247-837-00	CARBON	1.8K	5%	1/6W
R173	1-247-847-00	CARBON	4.7K	5%	1/6W
R174	1-247-873-00	CARBON	56K	5%	1/6W
R175	1-247-847-00	CARBON	4.7K	5%	1/6W
R176	1-247-867-00	CARBON	33K	5%	1/6W
R177	1-247-871-00	CARBON	47K	5%	1/6W
R178	1-247-879-00	CARBON	100K	5%	1/6W
R179	1-247-851-00	CARBON	6.8K	5%	1/6W
R180	1-247-851-00	CARBON	6.8K	5%	1/6W
R183	1-247-843-00	CARBON	3.3K	5%	1/6W
R184	1-247-831-00	CARBON	1K	5%	1/6W
R185	1-247-863-00	CARBON	22K	5%	1/6W
R186	1-247-855-00	CARBON	10K	5%	1/6W
R187	1-247-855-00	CARBON	10K	5%	1/6W
R201	1-247-823-00	CARBON	470	5%	1/6W
R202	1-249-421-11	CARBON	2.2K	5%	1/6W
R203	1-247-859-00	CARBON	15K	5%	1/6W
R204	1-247-855-00	CARBON	10K	5%	1/6W
R205	1-247-855-00	CARBON	10K	5%	1/6W
R206	1-247-873-00	CARBON	56K	5%	1/6W
R207	1-247-831-00	CARBON	1K	5%	1/6W
R208	1-247-855-00	CARBON	10K	5%	1/6W
R209	1-247-845-00	CARBON	3.9K	5%	1/6W
R210	1-247-831-00	CARBON	1K	5%	1/6W
R211	1-247-091-00	CARBON	22	5%	1/4W
R212	1-247-841-00	CARBON	2.7K	5%	1/6W
R301	1-249-421-11	CARBON	2.2K	5%	1/6W
R302	1-247-159-00	CARBON	15K	5%	1/4W
R303	1-247-168-00	CARBON	36K	5%	1/4W
R304	1-247-149-00	CARBON	5.6K	5%	1/4W
R305	1-247-152-00	CARBON	7.5K	5%	1/4W
R307	1-247-149-00	CARBON	5.6K	5%	1/4W
R308	1-247-717-11	CARBON	2.2K	5%	1/4W
R309	1-249-459-11	CARBON	12K	5%	1/4W
R310	1-247-133-00	CARBON	1.2K	5%	1/4W
R311	1-246-543-00	CARBON	820K	5%	1/4W
R312	1-247-167-00	CARBON	33K	5%	1/4W
R313	1-247-137-00	CARBON	1.8K	5%	1/4W
R315	1-247-847-00	CARBON	4.7K	5%	1/6W
R316	1-247-847-00	CARBON	4.7K	5%	1/6W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R317	1-247-879-00	CARBON	100K	5%	1/6W
R401	1-249-421-11	CARBON	2.2K	5%	1/6W
R402	1-247-159-00	CARBON	15K	5%	1/4W
R403	1-247-168-00	CARBON	36K	5%	1/4W
R404	1-247-149-00	CARBON	5.6K	5%	1/4W
R405	1-247-152-00	CARBON	7.5K	5%	1/4W
R407	1-247-149-00	CARBON	5.6K	5%	1/4W
R408	1-247-717-11	CARBON	2.2K	5%	1/4W
R409	1-249-459-11	CARBON	12K	5%	1/4W
R410	1-247-133-00	CARBON	1.2K	5%	1/4W
R411	1-246-543-00	CARBON	820K	5%	1/4W
R412	1-247-167-00	CARBON	33K	5%	1/4W
R413	1-247-137-00	CARBON	1.8K	5%	1/4W
R415	1-247-847-00	CARBON	4.7K	5%	1/6W
R416	1-247-847-00	CARBON	4.7K	5%	1/6W
R417	1-247-879-00	CARBON	100K	5%	1/6W
R501	1-247-847-00	CARBON	4.7K	5%	1/6W
R502	1-215-447-00	METAL	12K	1%	1/6W
R503	1-215-444-00	METAL	9.1K	1%	1/6W
R504	1-247-831-00	CARBON	1K	5%	1/6W
R505	1-247-831-00	CARBON	1K	5%	1/6W
R506	1-247-799-00	CARBON	47	5%	1/6W
R507	1-247-879-00	CARBON	100K	5%	1/6W
R508	1-249-421-11	CARBON	2.2K	5%	1/6W
R509 ⚠	1-217-387-00	FUSIBLE	10	5%	1/4W F
R510	1-249-421-11	CARBON	2.2K	5%	1/6W
R511	1-249-421-11	CARBON	2.2K	5%	1/6W
R512	1-247-831-00	CARBON	1K	5%	1/6W
R514	1-247-202-00	CARBON	27	5%	1/2W
R601	1-247-811-00	CARBON	150	5%	1/6W
R602	1-247-819-00	CARBON	330	5%	1/6W
R701	1-247-855-00	(FORMER)...CARBON	10K	5%	1/6W
R702	1-247-855-00	(FORMER)...CARBON	10K	5%	1/6W
R703	1-247-839-00	(FORMER)...CARBON	2.2K	5%	1/6W
RV101	1-226-704-00	RES, ADJ, METAL GLAZE 470K			
RV102	1-226-773-00	RES, ADJ, METAL GLAZE 22K			
RV103	1-226-773-00	RES, ADJ, METAL GLAZE 22K			
RV104	1-226-703-00	RES, ADJ, METAL GLAZE 10K			
RV106	1-226-702-00	RES, ADJ, METAL GLAZE 2.2K			
RV201	1-226-703-00	RES, ADJ CARBON 10K			
S601	1-554-303-00	SWITCH, KEY BOARD (PLAY)			
S602	1-554-303-00	SWITCH, KEY BOARD (PAUSE)			
S603	1-554-303-00	SWITCH, KEY BOARD (STOP/RESET)			
S604	1-554-303-00	SWITCH, KEY BOARD (OPEN/CLOSE)			
S605	1-554-303-00	SWITCH, KEY BOARD			
S606	1-554-303-00	SWITCH, KEY BOARD			
S607	1-554-303-00	SWITCH, KEY BOARD			
S608	1-554-303-00	SWITCH, KEY BOARD			
S609	1-554-303-00	SWITCH, KEY BOARD			
S610	1-554-303-00	SWITCH, KEY BOARD			
S611	1-554-303-00	SWITCH, KEY BOARD (A B)			
S612	1-554-303-00	SWITCH, KEY BOARD (1/ALL)			
S613	1-554-303-00	SWITCH, KEY BOARD (TIME)			
S701 ⚠	1-554-205-00	SWITCH, PUSH (LASER ON/OFF)			
S702	1-570-202-11	SWITCH, LEAF (LIMMIT)			

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

ELECTRICAL PARTS

Ref.No.	Part No.	Description
S703	1-570-203-11	SWITCH, LEAF (LOADING)
S707 ⚠	1-553-318-00	SWITCH, PUSH (POWER)
T701 ⚠	1-448-148-11	(US).....TRANSFORMER, POWER
T701 ⚠	1-448-149-11	(E).....TRANSFORMER, POWER
T701 ⚠	1-448-150-11	(AEP,G-AEP,UK)...TRANSFORMER, POWER
X101	1-527-822-00	OSCILLATOR, CERAMIC
X102	1-567-301-11	OSCILLATOR, CRYSTAL
X103	1-527-948-00	VIBRATOR, CRYSTAL
VS701 ⚠	1-526-576-51	(E)...SELECTOR, POWER VOLTAGE

ACCESSORY & PACKING MATERIAL

Part No.	Description
1-551-734-11	CORD, CONNECTION (RK-74A)
2-370-716-00	SHEET, PROTECTION
3-536-638-00	(E)...BAG, POLYETHYLENE
3-701-630-00	BAG, POLYETHYLENE
3-703-390-01	(US)...INSTRUCTION
3-760-366-11	(AEP,G-AEP,UK,E)...MANUAL, INSTRUCTION
3-760-366-21	(US).....MANUAL, INSTRUCTION
3-760-366-41	(AEP,G-AEP).....MANUAL, INSTRUCTION
3-795-629-14	(AEP).....INSTRUCTION
4-605-140-01	SHEET, PROTECTION
4-910-455-01	CUSHION (RIGHT), LOWER
4-910-456-01	CUSHION (LEFT), LOWER
4-910-457-01	CUSHION (LEFT), UPPER
4-910-458-01	CUSHION (RIGHT), UPPER
4-910-461-11	(US).....INDIVIDUAL CARTON
4-910-461-21	(AEP,G-AEP,UK,E)...INDIVIDUAL CARTON

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